SC06951

WORKING PAPER

SUPPORT FACILITIES

AT THE

SOVIET SENSITIVE OPERATIONS COMPLEXES

SUMMARY

This study provides additional details on the nature and extent of the support facilities at the 11 Soviet Sensitive Operations Complexes (SOCs). This includes housing, administration, utilities, transportation, security, and communications facilities. The average estimated population at these complexes is 2,310 in the main housing area and 1,030 in the military housing area. The utilities available are generally consistent with the needs of a population of this size and are not capable of supporting any large-scale manufacturing process.

All of the SOCs have rail facilities, either within the complex itself or nearby, and a heliport is present at all sites except one (which is still in early stages of construction). Communications facilities have been identified at most of the sites, including several hardened (buried) antennas. Security measures in the support areas include a single fence or wall around certain facilities and check-points at the main entrances to the complex. Multiple fencing is present at the Operations Area where the large bunkers are located.

The findings of this study, while not providing a firm identification of the function(s) of these complexes, are not inconsistent with the conclusion stated in an earlier IAS report 2/

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FIGURE 1. SENSITIVE OPERATIONS COMPLEXES, USSR.

INTRODUCTION

A detailed study of the support facilities at the 11 Soviet Sensitive Operations Complexes was conducted in an effort to determine the functions of these high-priority installations (Figure 1).1/

The complexes are located in western USSR at the coordinates listed below:

Site	Geographic Coordinates*
Belev	53-32N 036-31E
Berezovka (Krasnoarmeyskoye)	51-11N 045-59E
Borisoglebsk	51-23N 041-56E
Bulyzhino	56-14N 028-19E
Chebsara	59-08N 038-40E
Golovchino	50-33N 035-45E
Malin (Radomyshl)	50-35N 029-28E
Mikhaylovka (Aleksandrovka)	48-51N 032-19E
Nyandoma	61-38N 040-21E
Rechitsa	52-27N 030-05E
Zhukovka	53-32N 033-55E

25X1

*These coordinates are for the center of the complex (i.e., a point approximately midway between the Main Housing and Administration Area and the Operations Area). The coordinates of specific areas within the complexes are given in the site descriptions.

The support facilities and services included in the study and discussed in this report are housing and administration, utilities, communications, transportation, and security. The bunkers and operations support facilities in the Operations Area were not included in this study because an earlier report covered these items in detail.2/ Good-quality, large-scale KH-7 photography was used for the detailed study of the complexes, with small scale KH-4 and limited TALENT coverage being used in some cases to establish chronological highlights and/or to update older large-scale coverage.

25X1

The construction support areas are reported in detail at only one complex (Belev) since they are not a part of the permanent facilities of the complexes, and they do not differ significantly from site to site. Most of these facilities are razed shortly after site construction is completed, although some of the workers housing units have remained intact long after the other facilities have been razed. For this reason, many of the two-family units and some BOQ-type units are included as part of the permanent housing facilities.

The estimated capacity of the permanent housing facilities is based on a floorspace allocation of 200 square feet per person in the Main Housing and Administration Area, and 75 square feet per person in the Military Housing Area.

The geographic locations given for the various areas of each complex are the coordinates of the center of those areas. The photography used for illustrations in this report is not necessarily the most recent coverage of each complex, but the information shown on the accompanying line drawings is current to the latest referenced mission covering each complex.

The comparative analysis which follows discusses the data on the support facilities at the various SOCs, highlighting the similarities and differences. This is followed by a detailed description of each installation.

COMPARATIVE ANALYSIS

Housing

Housing facilities at the Sensitive Operations Complexes consist primarily of multistory apartments in the Main Housing and Administration Area and multistory barracks in the Military Housing Area. The apartments are for the most part 4 stories high and are very similar, if not identical, to apartments currently being constructed in many Soviet cities and installations. The early complexes of Berezovka, Chebsara, and Golovchino also have other types of apartments. Other types of housing units found in limited numbers at some of the complexes include one- and two-family units and BOQ-type units. Many of these types of units are remnants of the construction workers housing areas, but they are usually retained as part of the permanent housing after the site construction is completed.

Other personnel support facilities usually seen in the Main Housing and Administration Areas of the complexes include a centrally located club-commissary, an H-shaped possible hospital usually in an isolated location along with two support buildings, at least one nursery school with several associated small recreational areas, a primary-secondary school, various types of athletic fields, and in one case (Mikhaylovka) a swimming pool. Many of the complexes also have small lakes, both man-made and natural, located nearby with beaches and boating facilities.

The Main Housing and Administration Areas of the SOCs are usually well laid out and well landscaped and represent a high-quality living area by Soviet standards. The average estimated population of these areas is 2,310 people. It should be emphasized here that this figure is not necessarily the number of workers at the complex, but rather of people, which includes dependents of workers (Table 1). Because nuclear weapons storage and maintenance is thought to be at least one of the functions of the SOCs, it is interesting to note that the estimated population, excluding barracks-type housing, of the Karabash Nuclear Weapons Stockpile Site is 2,700 people.16/ This slightly larger population could probably be accounted for by the fact that the Karabash site has nine bunkers and/or underground vaults compared to the usual SOC complement of from three to eight bunkers.

Table 1. Approximate Floorspace and Estimated Capacity of the Housing Areas of the Soviet Sensitive Operations Complexes.

	Main Housing and Administration Area		Military Housing Area	
Site	Total Approximate Floorspace (square feet) (b)	Estimated Capacity (c)	Total Approximate Floorspace (square feet) (b)	Estimated Capacity
Belev	471,360	2,360	78,230	1,040
Berezovka	515,990	2,590 (d)	82,180	1,100
Borisoglebsk	480,400	2,400	88,240	1,180
Bulyzhino	403,840	2,020	81,350	1,090
Chebsara	444,780	2,230	46,820	720
Golovchino	616,210	3,090	89,210	1,190
Malin (a)	382,280	1,920	38,760	520
Mikhaylovka	521,590	2,600	82,680	1,100
Nyandoma	361,570	1,800	74,360	990
Rechitsa	392,100	1,960	85,800	1,140
Zhukovka	488,790	2,440	92,220	1,230
Totals	5,078,910	25,410	839,850	11,300

(a) The housing areas at Malin were still under construction as of [redacted] These figures are, therefore, tentative.
(b) Approximate floorspace of a building as used in this report is actually roof cover times the number of stories.
(c) The estimated capacity is based on an allocation of 200 square feet of approximate floorspace per person in the Main Housing and Administration Area facilities, and 75 square feet per person in the Military Housing Area Barracks.
(d) These figures include the Rail Facility Apartments.

The multistory barracks seen in the Military Housing Areas are not unique to the SOCs, but are commonly found at most types of Soviet military installations. These barracks provide living quarters at each complex for an average estimated 1,030 persons. The comparable number of military personnel at Karabash is 840; however, an additional barracks under construction at the site will raise this total to approximately 1,300. Usually found in the Military Housing Areas in association with the barracks are a mess hall, a small administration building, a possible recreation hall, revetted ammunition storage, animal pens, athletic fields, and in some cases a probable gymnasium. One of the primary functions of the Military Housing Area is believed to be the support of troops providing the physical security for the various areas of the complex, particularly the Operations Area.

Administration

Administration of the complexes is apparently conducted in a 2-story main administration building and also possibly in other admin/institutional-type buildings found at many of the sites.

Utilities

Water. Wells are the primary source of water for the support areas of at least six of the complexes. In addition, probable wells are located near some of the bunkers in the Operations Areas of Borisoglebsk, Bulyzhino, Rechitsa, and Zhukovka.

The wells serving the support areas have small well houses, some of which are secured. The probable wells near the bunkers are similar in appearance, but the well houses are situated atop low, earth mounds. This earth mounding may be an attempt to harden the wellhead somewhat. Probable buried pipelines can be identified, in some cases, connecting the support area wells with a water treatment facility or a standpipe. Similar pipelines can also be seen connecting some of the bunkers with the probable wells nearby.

The purity of the water seems to vary from complex to complex. Evidence of this is in the fact that water treatment facilities were identified at only four of the complexes. This probably indicates that the water at those sites where there is no treatment facility is of very high purity. Even at those complexes which have treatment facilities, the simplicity of the facility seems to indicate minimum treatment of relatively high-purity water.4/ Water standpipes for storage of water and maintenance of pressure were identified at all sites except Malin.

Sewage Treatment. The sewage treatment plants at the SOCs can be categorized into four basic types. Type I consists of a coarse-solids removal unit, 1 or 2 earth-mounded sludge digestors, small overflow basins, and varying numbers of sludge lagoons. The process at this type of plant begins with the untreated sewage passing through a coarse-solids removal unit where screens remove coarse materials such as wood, stones, rags, etc., which would retard bacterial action in the sludge digestors. The next step is the introduction of raw sewage into the digestor(s) where most of the liquid is separated prior to the digestive process where bacterial action stabilizes the sludge. The stabilized sludge, which settles to the bottom of the digestor(s), is then pumped out to the sludge lagoons where the remaining water is removed from the sludge by evaporation and drainage into the soil. The dried sludge is periodically removed from the lagoons by scrapers. Type I plants are located at Borisoglebsk, Bulyzhino, Rechitsa, and Zhukovka.

The Type 2 plants, located at Borisoglebsk and Nyandoma, are very similar in appearance and operation to the Type I plants except that sludge dewatering at the Type 2 plants apparently takes place in a dewatering building rather than lagoons. The process utilized in this building cannot be positively identified, but a good possibility is the vacuum filter-incinerator method. The water which has been removed from the sludge in this building is pumped into drainage ditches or nearby streams, and the dried sludge is either burned or hauled away.

The Type 3 plants are similar to the Type 2 plants, but they have sludge drying beds in addition to the coarse-solids removal unit, digestor(s), and dewatering building. These sludge drying beds are similar to, but much smaller than, the sludge lagoons and they may serve as a back-up to the dewatering building. This type of plant is located at Belev and Chebsara.

Type 4 plants, located at Berezovka (possible) and Mikhaylovka, consist of the same facilities as the Type 3 plant except for the dewatering building which is not present.

Three of the complexes have two sewage treatment plants. Borisoglebsk has one Type 2 and one Type 1; Mikhaylovka has a Type 4 and one unidentified type; and Zhukovka has two Type 1 plants. A possible sewage treatment plant of unknown type is under construction at Malin. No plant was identified at Golovchino.

Electric Power. Electric power at the SOCs, where it could be identified, consists of 35 kv or 110 kv stepped down to low-voltage (less than 35 kv) by either on- or off-site substations. The substations serving Bulyzhino and Nyandoma could not be located; however, low-voltage powerlines/communications lines were identified at these sites. A back-up power source, consisting of either a separate powerline or an on-site diesel generating plant, was identified at five of the complexes. The diesel power plants, ranging in size from 61 by 44 feet to 134 by 66 feet, were identified at Bulyzhino, Chebsara, Golovchino, and Nyandoma. Associated with these power plants are a cooling tower and POL storage tanks. A separate 110 kv powerline provides the back-up power source for the Mikhaylovka Complex. Above-ground powerlines could not be identified within the Operations Areas of any of the complexes, but the presence of buried lines cannot be ruled out.

Steam. One or more steam plants are located at each of the eleven complexes. At six of the sites (Belev, Bulyzhino, Golovchino, Malin, Mikhaylovka, and Rechitsa), one main plant apparently serves the entire complex. Three of the sites (Borisoglebsk, Nyandoma, and Zhukovka) have two plants: one serving the Military Housing Area and/or Operations Area, and one plant serving the Main Housing and Administration Area. The other two complexes (Berezovka and Chebsara) have the two plants described above and also an additional plant located at their rail facilities which are 12 nm and 3 nm respectively from the main complex.

Steamlines (both above-ground and buried) which could be traced are shown on the line drawings of each site. Steamlines were identified in the Operations Areas of Berezovka, Chebsara, and Nyandoma leading to the bunkers and operations support buildings. Similar lines leading only to the operations support buildings were identified at Borisoglebsk and Zhukovka. Steamlines could not be identified in the Operations Areas of any of the other complexes, but buried lines cannot be entirely negated.

Natural Gas. Only at two complexes is there any evidence of a natural gas pipeline. At Berezovka, a gas/oil pipeline connects the site with the gas/oil fields in the Saratov area to the north, and a probable natural gas pipeline has recently been completed into the Zhukovka Complex.5/

Communications

All of the complexes except Golovchino and Malin have at lease one communications facility, and five of the complexes (Berezovka, Mikhaylovka, Nyandoma, Rechitsa, and Zhukovka) each have two.

The complexes, with the above two exceptions, all have a communications facility located near the Operations Area at the Military Housing Area or, as is the case with Berezovka, within the Operations Area. These facilities all have a bunkered control building with various types of antennas associated with it. The types of antennas often vary somewhat from complex-to-complex, but usually consist of one or more of the following: a hardened (buried) antenna, a vee (quadrant) antenna, pairs of day/night horizontal dipoles, and single horizontal dipoles.6/

The second communications facility located at the five previously mentioned complexes are found either in the Main Housing and Administration Area or at the Rail Facility and usually consist of a control building with associated horizontal dipole(s) and/or probable microwave antenna.

The Golovchino Complex has an earth-covered bunker located in the Military Housing Area with suspect antenna locations nearby. A communications facility could not be identified at the Malin Complex.

A listing of the communications facilities which have been identified at the SOCs is contained in Table 2.

Table 2. Communications Facilities at the Soviet Sensitive Operations Complexes.

Site	Area	Control Building/Bunker Present	Type of Antenna
Belev	MHA	Bunker	Possible hardened
Berezovka	RF	Building	Probable microwave
	OA	Bunker	Pair of day/night horizontal dipoles
			VEE (quadrant)
			UHF/VHF
Borisoglebsk	MHA	Bunker	Pair of day/night horizontal dipoles
			VEE (quadrant)
			Probable hardened
Bulyzhino	MHA	Bunker	Possible hardened
Chebsara	MHA	Bunker	Probable VHF antenna and at least 3 horizontal dipoles
Golovchino	MHA	Bunker	(a)
Malin			No facilities could be identified
Mikhaylovka	MHAA	Building	Probable microwave
			Horizontal dipole
			Horizontal dipole
	MHA	Bunker	Probable hardened
Nyandoma	RF	Building	Pair of day/night horizontal dipoles
	MHA	Bunker	Hardened
Rechitsa	MHAA	Building	Horizontal dipole
			Horizontal dipole
	MHA	Bunker	Pair of day/night horizontal dipoles
			VEE (quadrant)
			Hardened
Zhukovka	MHAA	Building	Pair of day/night horizontal dipoles
	MHA	Bunker	Horizontal dipole
			VEE (quadrant)

OA--Operations Area
RF--Rail Facility
MHA--Military Housing Area
MHAA--Main Housing and Administration Area

(a) Antennas could not be identified at this compfex. See text.
(b) Unable to determine this dimension/ azimuth.

Transportation

Motor. The primary roads within the complexes are, for the most part, two lane, all-weather, hard-surfaced (usually concrete) roads. These high-quality roads provide access to the main areas and facilities of the sites including the bunkers in the Operations Area.

The types of vehicles observed at the complexes include vans and cargo trucks of various sizes, jeep-type utility trucks, truck-mounted cranes, probable generator trailers and buses. No special vehicles were identified which might indicate the function of the SOCs. However, the types of vehicles observed are common to Soviet nuclear weapons stockpile sites.

All of the complexes have motor pools which provide from approximately 50,000 to 91,000 square feet of floorspace for the storage and maintenance of vehicles, plus large open parking areas.

Driver training courses, consisting of a typical figure eight course and in some cases additional obstacles, are located at most of the complexes.

Rail. All but two of the SOCs (Berezovka and Chebsara) are directly rail-served. Rail service is available, however, to these two complexes at rail facilities which are located 12 nm and 3 nm respectively from their Main Housing and Administration Areas. All of the complexes have similar rail facilities (see example Figure 26) which usually consist of a large traveling bridge crane used for rail-to-road transfer, a multitrack rail car holding yard, a locomotive shed, warehouses and storage buildings, and POL storage. These facilities are usually all located within the same area which is sometimes separately secured from the rest of the complex. The traveling bridge cranes at Belev, Malin, Mikhaylovka, and Zhukovka, however, are located within their respective Operations Areas and not in the rail facilities. Dimensions of these cranes vary from 235 to 320 feet long by 70 feet wide. The crane motor housing was measured on good-quality photography of the Borisoglebsk Complex and found to be feet. The center-to-center distance between the two crane rails was

Rolling stock observed at the complexes included a wide range of sizes, but the majority of the cars were in the 80-foot-long category. Standard Soviet cars of this length include passenger, baggage, mail, and dining cars.

Air. None of the SOCs have airfields associated with them. Except for Malin, however, they all do have various types of heliports. At the earlier sites of Berezovka, Chebsara, and Golovchino, these heliports are merely large, rectangular concrete pads. The heliports at the other sites consist of from one to four small, connected concrete pads. The most common type, a T-shaped configuration, is found at Borisoglebsk, Bulyzhino, Nyandoma, Rechitsa, and Zhukovka. The Belev facility consists of 3 pads in an L-shaped configuration and Mikhaylovka's heliport is merely one small pad.

Fagot/Fresco and Beagle aircraft have been observed at several of the complexes. The function of these aircraft remains unknown.

Water. No water transport facilities were identified at any of the complexes.

Security

Operations Area. The entire Operations Areas of the complexes are secured by from one to three fences. In addition, the bunkers and in some cases the operations support facilities are usually separately secured by single fences. Patrol roads/trails were identified at many of the sites along or near the perimeter fence(s). Checkpoints are located at the Operations Area entrances, and guardposts are positioned at strategic points around the perimeter at several sites.

Support Areas. Security fences and walls which were observed in the various support areas of the complexes are shown in the line drawings of each complex. Facilities which are found at many of the complexes and which probably provide direct support to the security operations are small arms firing ranges, small revetted ammunition storage buildings, and animal pens which may be for housing sentry dogs. The latter two facilities, when present, are always located in or near the Military Housing Area.

SITE DESCRIPTIONS

Belev

The Belev Sensitive Operations Complex is located approximately 18.5 nautical miles (nm) southeast of the city of Belev (Figure 1). 7/ The main components of the complex are a Main Housing and Administration Area, a Military Housing Area and an Operations Area (Figure 2). Support facilities in these areas include a rail facility, motor pool, heliport, sewage treatment plant, water treatment/pumping facility, and construction support facilities (Figure 3). Geographic coordinates of the Main Housing and Administration Area are 53-33-00N 036-29-00E. Coordinates of the collocated Operations Area and Military Housing Area are 53-31-50N 036-32-30E. Construction at the complex is apparently nearing completion. The photographic coverage dated showed that Bunker 6 had been completed and was being earth-covered,and no additional significant construction activity was evident.

Housing and Administration. Housing facilities in the Main Housing and Administration Area at Belev consist of 12 four-story apartments with a total floorspace of approximately 454,760 square feet, and 14 two-family units with approximately 21,600 square feet of floorspace. The estimated total capacity of these facilities is 2,360 people.

Administration of the site apparently takes place in a two-story, U-shaped admin/institutional-type building and a small admin building located in this area (items 70 and 71, Figure 3). Other facilities in this area, which are in direct support of the housing, are a club-commissary, two nursery schools, a primary-secondary school, and various types of athletic fields. In addition, a fire station is located adjacent to the motor pool.

Additional housing facilities, in the form of two 3-story barracks, are located near the Operations Area in the Military Housing Area (Figure 3). Estimated capacity of these barracks is 1,040 military personnel. Additional facilities located in this area supporting the housing are a messhall, an administration building, a possible administration building, two storage buildings, and three unidentified buildings.

Utilities. Seven wells located between the Main Housing and Administration Area and the Operations Area apparently are the primary, if not exclusive, source of water for the complex. These wells are connected to a Water Treatment/Pumping Facility by a network of probable buried pipelines (Figure 3). The secured Water Treatment/Pumping Facility consists of a 70 building, a buried tank, and one additional small building. The treatment process utilized in this facility, if any, is not apparent, but it is obvious by the physical size of the components that it probably is a relatively simple one. This probably indicates that the water is of high purity requiring little or no treatment. A standpipe, 31 feet in diameter, is located between this facility and the steamplant.

The sewage treatment plant serving the complex is located just northwest of the Main Housing and Administration Area (Figure 3). The separately secured facility consists primarily of a possible coarse solids removal unit, two 35-foot-diameter, earth-mounded digestors, a building which probably houses an unidentified dewatering process and six sludge drying beds with a total surface area of 10,890 square feet.

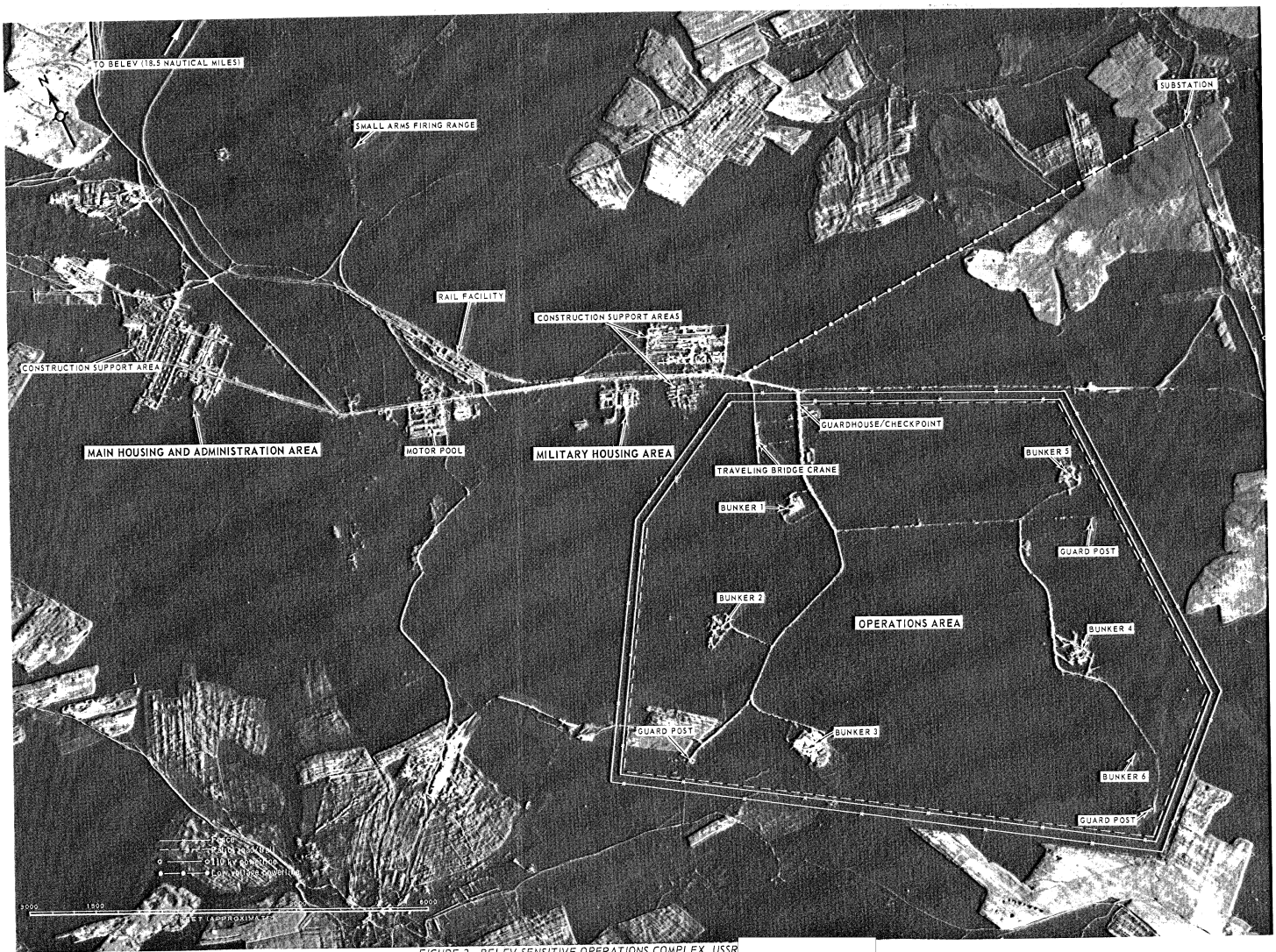


FIGURE 2. BELEV SENSITIVE OPERATIONS COMPLEX, USSR

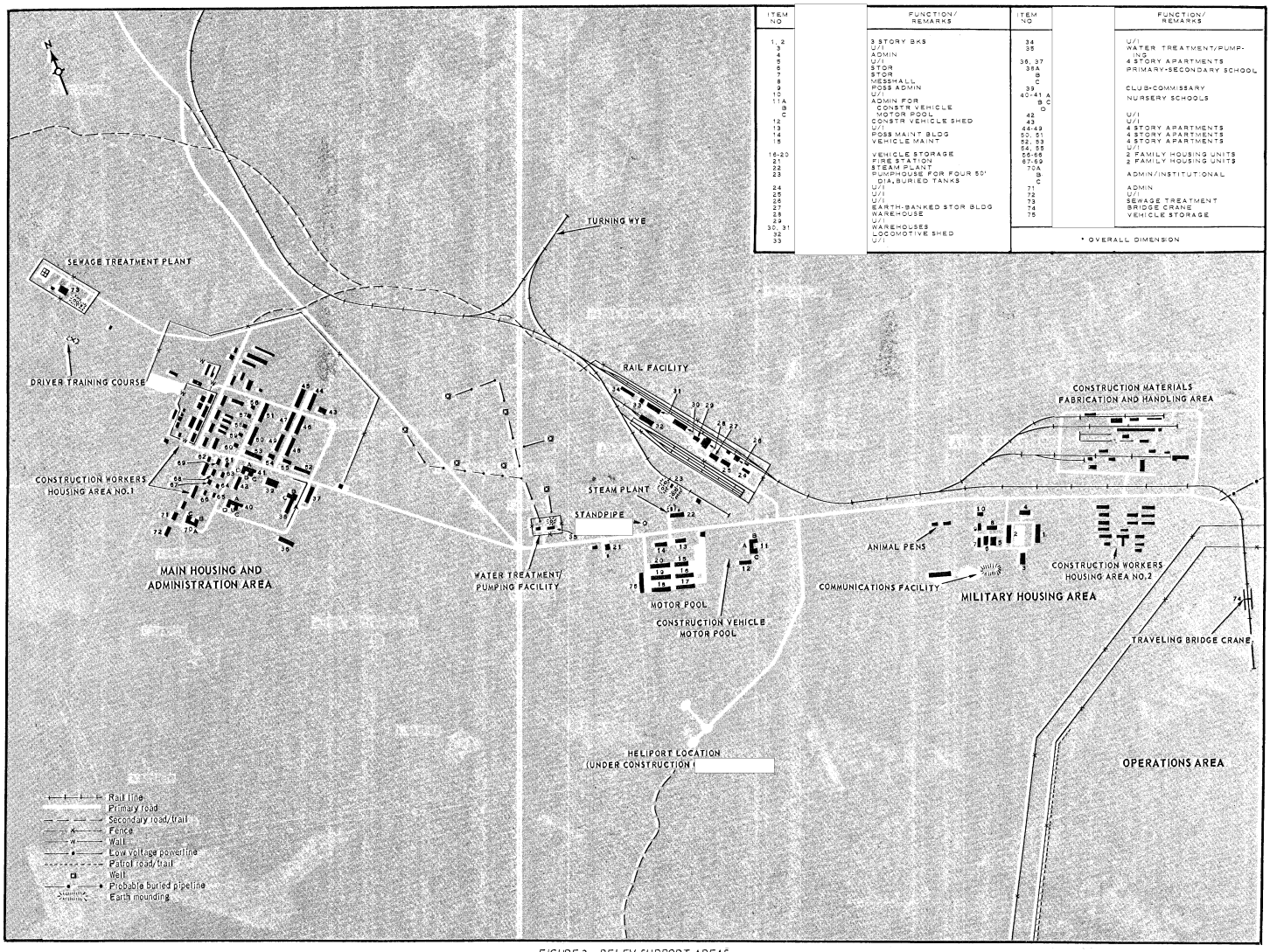


FIGURE 3. BELEV SUPPORT AREAS.

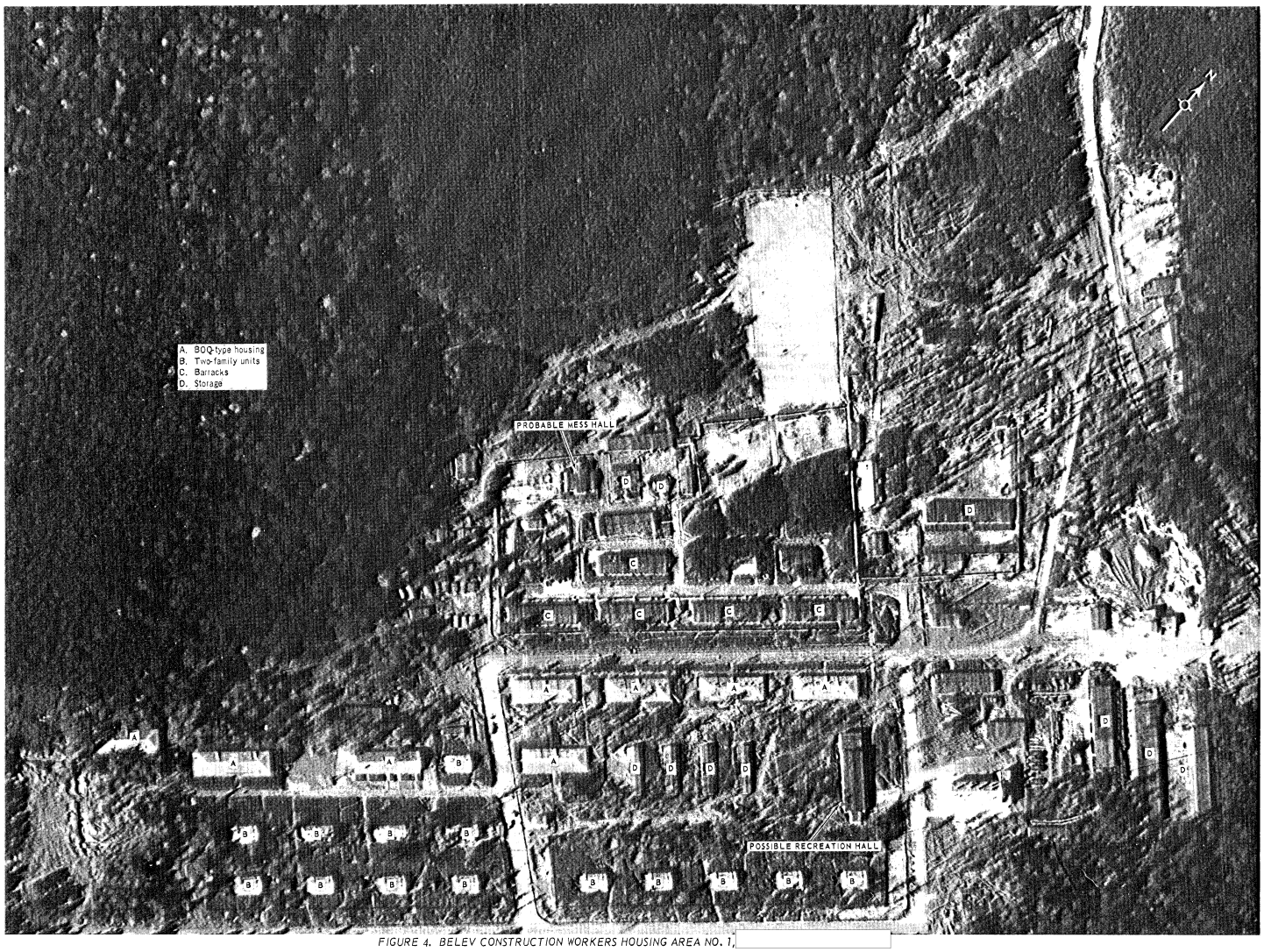


FIGURE 4. BELEV CONSTRUCTION WORKERS HOUSING AREA NO. 1,

Electric power at the site is provided by a low voltage* powerline from a substation located 6,700 feet northwest of the Operations Area (Figure 2). The substation itself is served by a 110-KV powerline which approaches from the south. No back-up source of electric power, such as that found at some of the other complexes, could be identified.

The only steam plant at the site is centrally located near the Rail Facility and Motor Pool. The oil-fired plant is and has four 50-foot-diameter buried tanks and a small pumphouse associated with it. Above ground steamlines could not be identified anywhere within the complex, and the lack of suitable snow cover photography precluded the tracing of buried lines.

Communications. A control bunker and a possible hardened (buried) antenna are located near the Military Housing Area (Figure 3). 6/ Identification of the possible hardened antenna is based on the recent addition of a rectangular clearing just west of the bunker. Orientation of the possible antenna is approximately toward Moscow. A more positive identification and mensuration of the antenna may be possible on future large-scale photographic coverage.

Transportation. The primary roads within the complex are two-lane, all-weather roads of concrete construction. Turning radii vary throughout the site and in some cases are very short. One example of this is the loop road serving the bridge crane in the Operations Area. The turns at the intersections of the loop road with the main road are nearly 90 degrees.

The Motor Pool at the complex consists of six vehicle storage buildings and one vehicle maintenance building which provide approximately 89,200 square feet of floorspace. A driver training course consisting of two typical figure eights and various other road configurations is located northwest of the Main Housing and Administration Area near the Sewage Treatment Plant.

The Belev SOC is directly rail-served by a spur from the Kozelsk-Gorbachevo line. The complex has a typical SOC-type rail facility consisting of a five-track railcar holding yard, a locomotive shed, an earth-banked storage building, three warehouses, and at least six unidentified buildings. A typical bridge crane measuring is located at the road-to-rail transfer point near the end of a rail spur inside the Operations Area.

The nearest airfield of any significance is located 42 nm to the southwest of the complex at Orel. The only air-transport-related facility at the site itself is an L-shaped concrete heliport which was under construction on photographic coverage dated and probably complete on coverage of This facility consists of three concrete pads/hardstands connected by concrete roads forming an "L" configuration (Figure 3).

Security. Perimeter security for the Operations Area is provided by at least two fences and a patrol road/trail (Figure 2). Guard posts are strategically located at three points along the perimeter and a guardhouse-checkpoint is located at the entrance to the area. No security fences could be seen around any of the bunkers, as is the case at most of the other complexes, but these could easily be concealed by the heavy tree cover near the bunkers.

Fences and walls which could be identified in the support areas of the complex are shown in Figure 3. The Rail Facility is probably completely secured even though a portion of the fence surrounding it was not visible. A fence also secures at least the northern and eastern sides of the Main Housing and Administration Area. The Water Treatment/Pumping Facility and the Sewage Treatment Plant are also secured by single fences.

Construction Support. The construction support facilities are located in four areas at the complex. These areas are Construction Workers Housing Areas 1 and 2, Construction Materials Fabrication and Handling Area, and a Construction Vehicle Motor Pool (Figure 3).

*Voltages less than 35-kv are considered low voltage for the purpose of this study.

Construction Workers Housing Area 1 is collocated with the Main Housing and Administration Area in the western portion of the complex (Figure 4). This area is comprised of five barracks, eight BOQ-type units, fourteen 2-family units, a possible recreation hall, a small probable messhall, at least ten storage buildings, and several other unidentified buildings. Estimated total personnel that could be accommodated in this area is 1,220. This is based on the following approximate floorspace allocations: Barracks--50 square feet per person; BOQ-type units--75 square feet per person; and 2 family units--200 square feet per person.

Of the construction workers housing at this complex, only the two-family units are included as part of the permanent housing totals in Table 1.

Construction Workers Housing Area 2 consists of nine barracks, one administration building, one messhall, and several other buildings (Figure 5). Estimated total capacity of the barracks is 960 people.

The rail-served Construction Materials Fabrication and Handling Area is comprised of five sections: a Possible Steel Working Section, a Concrete Aggregate Processing and Batching Section, a Concrete Prefabricating Section, a Possible Vehicle Maintenance Section, and a Woodworking Section (Figure 5). The Possible Steel Working Section consists of five large and several small buildings. Stacks of dark linear objects which appear to be different size pieces of steel are visible in the western half of the section. The Concrete Aggregate Processing and Batching Section consists of a concrete batch plant and provisions for off-loading, storage, and conveyance of aggregate to the plant. The Concrete Prefabricating Section is basically a long line of forms for prefabricating different shapes and sizes of concrete castings. These forms are serviced by two track-mounted cranes located on either side of the forms. Various sizes and shapes of castings are also stored in this section. The Possible Vehicle Maintenance Section contains at least six buildings, one of which appears to be the maintenance building. What appear to be grease racks are visible in the western end of the section. Facilities in the Woodworking Section include a sawmill, a probable woodworking shop and at least four other buildings. Stacks of lumber, both rough and finished, are located throughout the section.

The Construction Vehicle Motor Pool, located near the permanent Motor Pool, consists mainly of a large parking area with an associated administration building and vehicle shed.

Berezovka

The Berezovka Sensitive Operations Complex is located on the east bank of the Volga River approximately 16 nm south of the city of Engels (Figure 1). 8, 9/ The Rail Facility serving the complex, however, is located at Anisovka only 3 nm south of Engels. The complex consists of a Main Housing and Administration Area, a Military Housing Area, and an Operations Area (Figure 6). Significant geographic coordinates of the complex are as follows; Main Housing and Administration Area: 51-11-30N 045-56-30E; Operations Area: 51-11-20N 046-01-20E; Rail Facility, 51-24-00N 046-03-45E. Support facilities in addition to the Rail Facility previously mentioned include a communications facility (Figure 6), a motor pool, a possible sewage treatment plant, a heliport, and construction support facilities which have, for the most part, been razed (Figures 8-10).

This complex was first observed on TALENT photography of 6 December 1959, at which time it was in the early stages of construction. KEYHOLE photography of showed that construction at the complex was nearing completion. At that time all construction in the Operations Area appeared essentially complete, and only four buildings were still under construction in the support areas.

Housing and Administration. Housing in the Main Housing and Administration Area of the complex consists of 6 four-story apartments, 23 two-story apartments, and 10 two-family units. Using the previously mentioned floorspace allocations

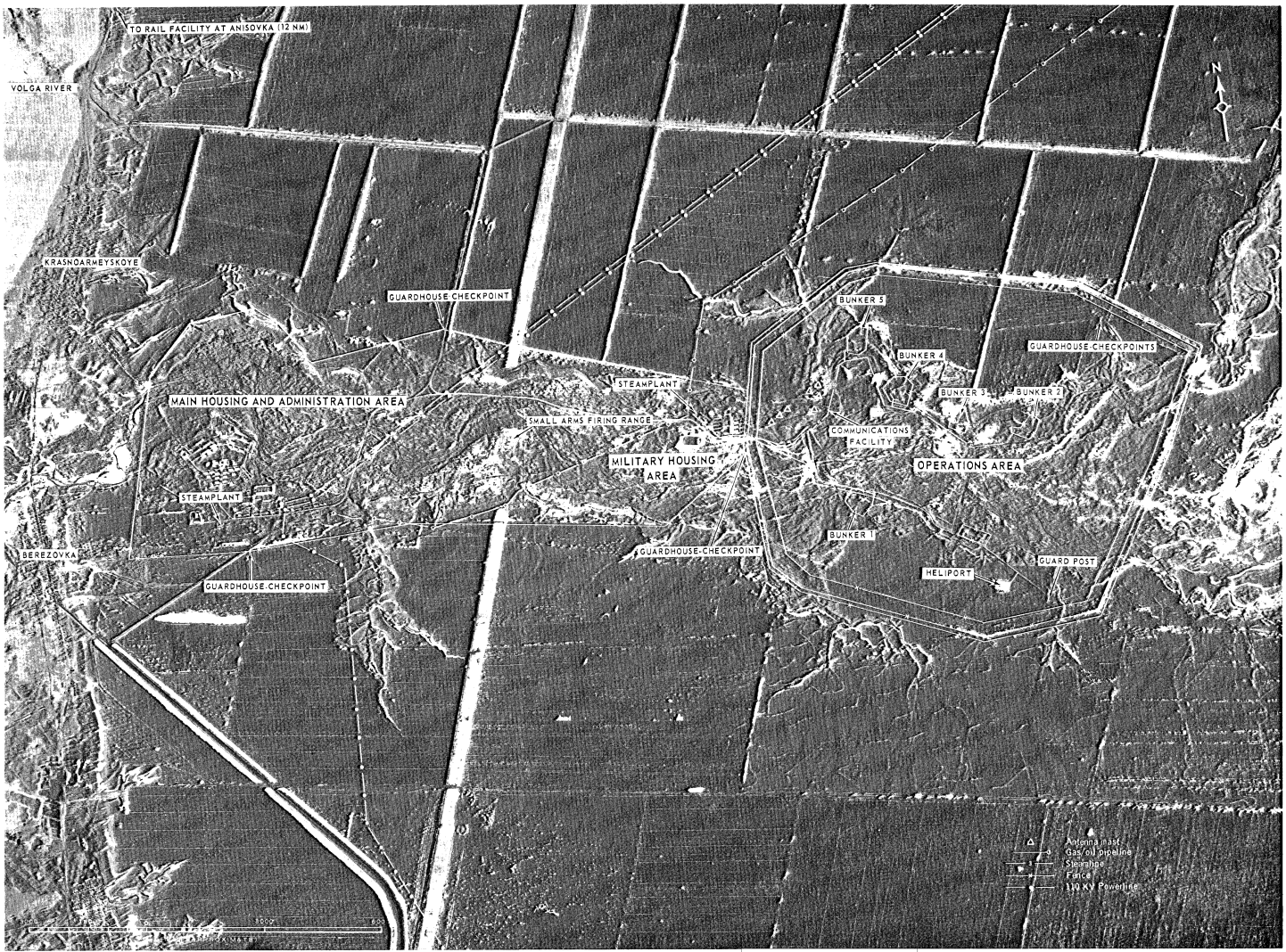


FIGURE 6. BEREZOVKA SENSITIVE OPERATIONS COMPLEX, USSR,

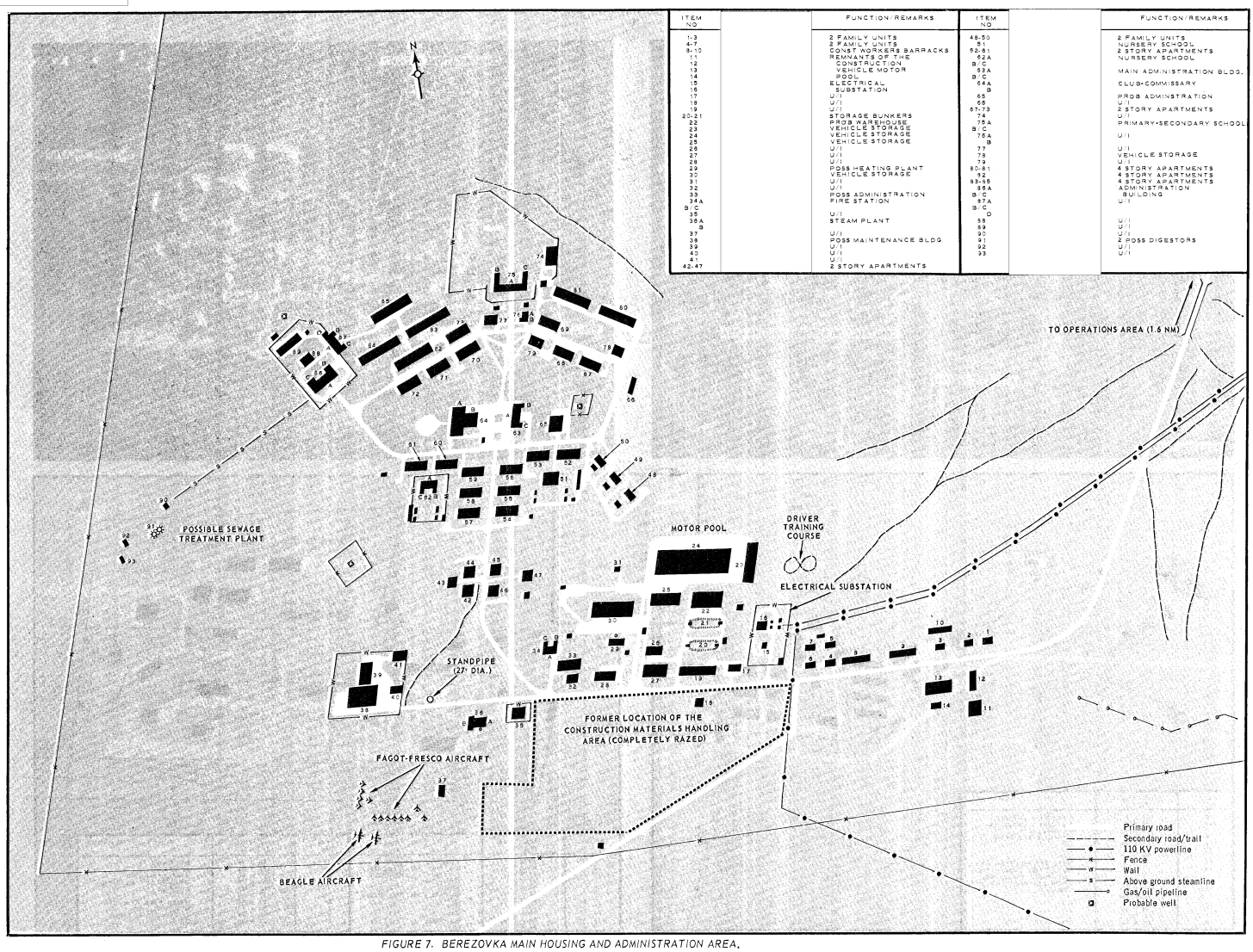
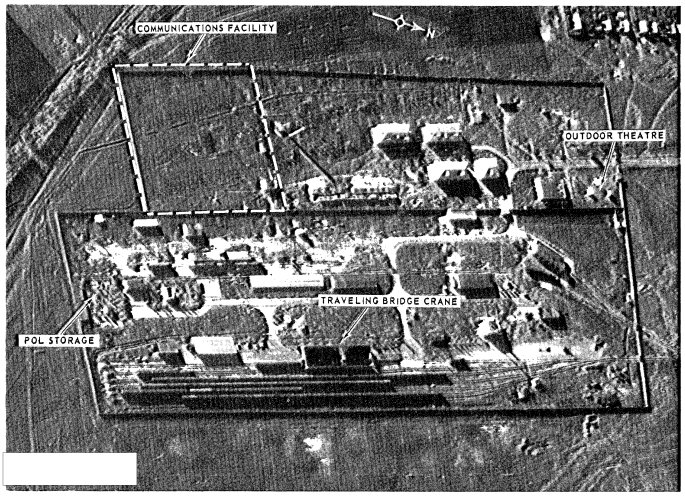
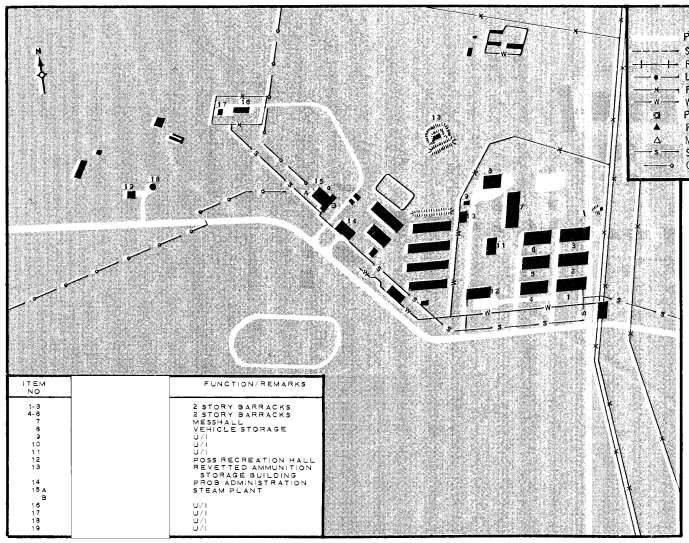


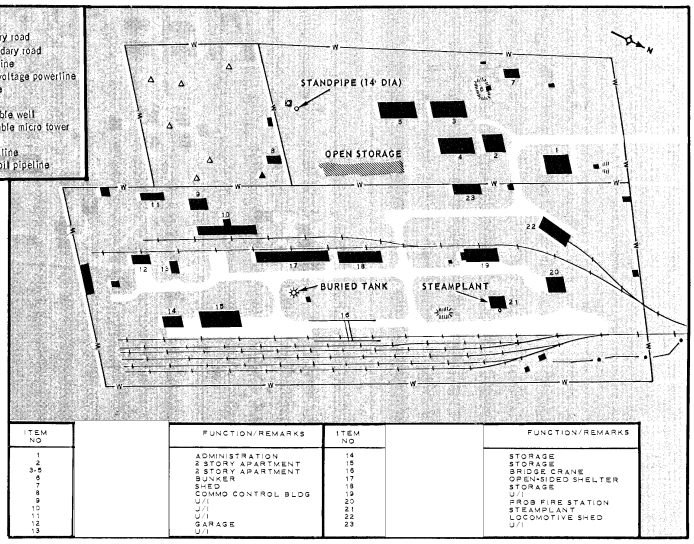
FIGURE 7. BEREZOVKA MAIN HOUSING AND ADMINISTRATION AREA.





ITEM NO	FUNCTION/REMARKS
1-3	2 STORY BARRACKS
4-6	2 STORY BARRACKS
7	MESSHALL
8	VEHICLE STORAGE
9	U/I
10	U/I
11	U/I
12	POSS RECREATION HALL
13	REVETTED AMMUNITION STORAGE BUILDING
14	PROB ADMINISTRATION
15A	STEAM PLANT
B	
16	U/I
17	U/I
18	U/I
19	U/I

FIGURE 8. BEREZOVKA MILITARY HOUSING AREA.



ITEM NO	FUNCTION/REMARKS	ITEM NO	FUNCTION/REMARKS
1	ADMINISTRATION	14	STORAGE
2	2 STORY APARTMENT	15	STORAGE
3-5	2 STORY APARTMENT	16	BRIDGE CRANE
6	BUNKER	17	OPEN-SIDED SHELTER
7	SHED	18	STORAGE
8	COMMO CONTROL BLDG	19	U/I
9	U/I	20	PROB FIRE STATION
10	U/I	21	STEAMPLANT
11	U/I	22	LOCOMOTIVE SHED
12	GARAGE	23	U/I
13	U/I		

FIGURE 9. BEREZOVKA RAIL FACILITY.

as a standard, an estimated 2,410 people could be accommodated in this area. Administration of the complex is apparently centered in a two-story, U-shaped building (item 63, Figure 7), and in three other smaller buildings within this area. Other support facilities located in the Main Housing and Administration Area include two nursery schools, a primary-secondary school, a club-commissary, a possible sewage treatment plant, and a fire station (Figure 7).

Six 2-story barracks provide housing accommodations for an estimated 1,100 military personnel in the Military Housing Area. Other facilities in this area which directly support housing and administration are a probable administration-type building, a messhall, a possible recreation hall, a garage, an outdoor theater, and several athletic fields (Figure 8).

Additional housing and administration facilities are also located at the Rail Facility 12 nm north of the complex. These facilities consist of 4 two-story apartments capable of housing an estimated 180 people, an administration building, an outdoor theater, and a small shed (Figure 9).

Utilities. Wells are probably the primary source of water for this complex. Three probable wells are located in the Main Housing and Administration Area and one in the Rail Facility. Water treatment facilities could not be identified in any area of the complex. This may indicate that the water is used directly from the wells with some chlorination possibly taking place in the well houses.

Sewage treatment may be accomplished in a possible sewage treatment plant located near the western boundary of the Main Housing and Administration Area. This possible plant consists of two possible earth-mounded digestors, two small possible basins, and three small unidentified buildings (Figure 7). The larger of the three buildings is served by an above-ground steamline. Another possibility is that the raw sewage is dumped directly into a stream which passes through the complex and empties into the Volga.

Electric power at the complex is provided by a 110-kv powerline which approaches the site from the Engels area and terminates at a substation located in the Main Housing and Administration Area (Figure 6). Although two 3-phase, 110-kv circuits enter the complex on the same pylons, one of these circuits does not serve the complex but is diverted toward the south just before reaching the substation (Figure 7). Low-voltage powerlines can be identified leading from the substation to all major areas of the complex with the exception of the Operations Area. The Rail Facility is served by a low-voltage line only (Figure 9). No alternate or back-up source of power could be identified at this complex.

Three steam plants are located in the main areas of the complex. One each of these plants is situated at the Main Housing and Administration Area, the Military Housing Area, and the Rail Facility. The first two plants, which are served by an oil/gas pipeline, are apparently identical. The Rail Facility plant is a smaller coal-fired plant. Steamlines in the Main Housing and Administration Area are buried for the most part and, due to a lack of suitable photography with light snow, could not be traced. The steamlines leading from the Military Housing Area plant are mostly buried in this area (Figure 8), but they emerge from the ground within the Operations Area. The above ground steamlines in the Operations Area serve all of the bunkers, including the communications control bunker, and the Operations Support Facilities (Figure 6).

The oil/gas pipeline which enters the complex near the Military Housing Area originates in the Engels area where numerous oil and gas fields and pipelines are located. Collateral information indicates that this particular pipeline carries oil. However, the absence of storage tanks at the complex suggests that it may actually carry natural gas.

Communications. Two communications facilities are associated with this complex. One is located in the Operations Area (Figure 6), and the other is at the Rail Facility (Figure 9). The Operations Area facility consists of a control bunker, a day/night pair of horizontal dipoles, a vee (quadrant) antenna and a UHF/VHF antenna. The horizontal dipoles are 185 and 120 feet long and have an azimuth of 315/135 degrees. The vee antenna is [redacted] with azimuths of 315/135 and [redacted] The communications facility located at the Rail Facility consists of a control building, a probable microwave tower, and at least six masts in unidentified configurations. Geographic coordinates of the Operations Area communications facility are 51-11-30N 046-00-20E. Coordinates of the other communications facility are essentially the same as those given for the Rail Facility.

Transportation. The primary roads within the complex are all-weather and appear at least in part to be of concrete construction. The motor pool serving the complex, consisting of one very large and three small vehicle storage buildings, is located in the Main Housing and Administration Area. These buildings have a combined floorspace of approximately 81,360 square feet. A typical figure-eight driver training course is located adjacent to the motor pool.

Although the complex is not directly rail-served, the previously mentioned rail facility at Anisovka provides the same services as those available at the other SOCs. The Rail Facility is nearly identical to the other SOC rail facilities in that it has a typical traveling bridge crane, a five-track holding yard, several storage buildings and a locomotive shed (Figure 9). This Rail Facility differs from the others in that it has housing and administration facilities and a communications facility directly associated with it. This is probably due to the fact that it is located 12 nm from the complex.

The only air transport related facility at the complex is a heliport. This facility, which is merely a large rectangular concrete pad, is located in the southeast corner of the Operations Area (Figure 6). Varying numbers of aircraft have been observed at this complex, both at the heliport and in an area within the Main Housing and Administration Area (Figure 7). The types and numbers of aircraft periodically observed have included from 10-19 Fagots/Frescos and 1-2 Beagles. The function of these aircraft or the reason for their presence at an installation not having an airfield cannot be determined from photography at this time. The nearest airfield of significance is located near Engels, 20 nm north of the complex.

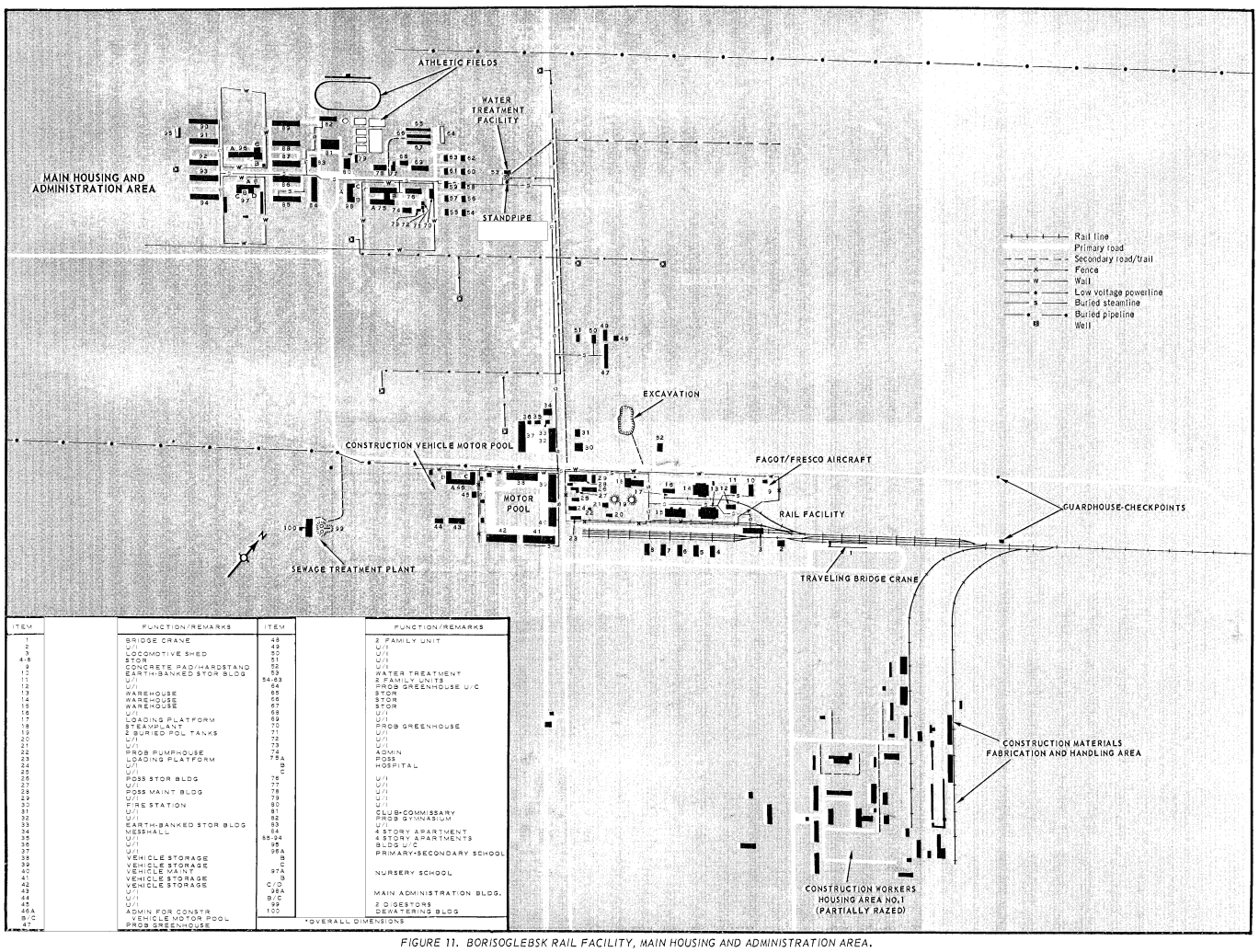
Security. Physical security for the Operations Area facilities is provided by three perimeter fences which encircle the entire area, by separate fences securing each bunker and part of the Operations Support Facilities, by checkpoints at the entrances to the area, and by a guard post situated on high ground near the heliport (Figure 6). In addition, small, regularly-spaced objects located around the perimeter between the fences are probably either a lighting or alarm system. The support areas are also secured by a perimeter fence. Several individual sections within these areas have additional fences or walls securing them (Figures 7 and 8). Access to the support areas is also limited by checkpoints at the two road entrances. A revetted building and animal pens in the Military Housing Area probably support the security operations at the complex. The small revetted building is probably used for the storage of small arms ammunition, and the animal pens may house sentry or patrol dogs.

Borisoglebsk

The Borisoglebsk Sensitive Operations Complex is located approximately 5 nm northwest of the city of Borisoglebsk and 1.5 nm south of Gribanovskiy (Figure 1). This complex consists of the three major areas typical of the SOCs. These are the Main Housing and Administration Area, the Military Housing Area and the Operations Area (Figure 10). Geographic coordinates of the Main Housing and Administration Area are 51-24-30N 041-57-15E; coordinates of the Operations Area are 51-21-45N 041-55-30E. Other significant support facilities at this complex include a rail facility, motor pool, sewage treatment plants, heliport, water treatment facilities and partially razed construction support facilities. This installation, which was first observed in an early construction phase on [redacted] 1962, appeared essentially complete on KEYHOLE [redacted]

Housing and Administration. Housing facilities at the complex consist of 11 four-story apartments, and 11 two-family units in the Main Housing and Admin-

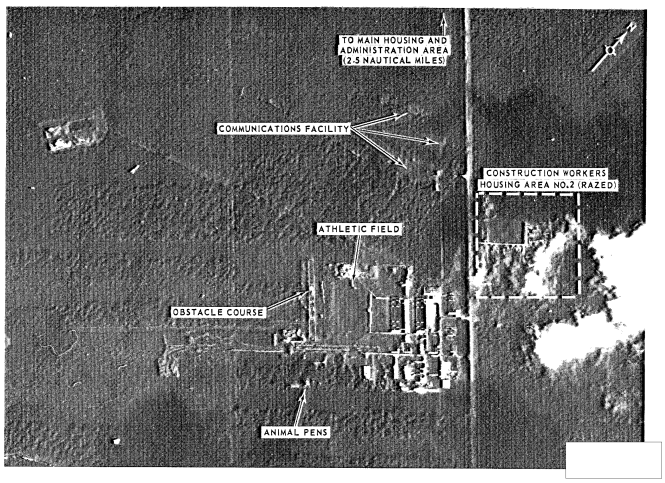
FIGURE 10. BORISOGLEBSK SENSITIVE OPERATIONS COMPLEX, USSR



ITEM	FUNCTION/REMARKS	ITEM	FUNCTION/REMARKS
1	BRIDGE CRANE	48	2 FAMILY UNIT
2	U/I	49	U/I
3	LOCOMOTIVE SHED	50	U/I
4-8	STOR	51	U/I
9	CONCRETE PAD/HARDSTAND	52	U/I
10	EARTH-BANKED STOR BLDG	53	WATER TREATMENT
11	U/I	54-63	2 FAMILY UNITS
12	U/I	64	PROB GREENHOUSE U/C
13	WAREHOUSE	65	STOR
14	WAREHOUSE	66	STOR
15	WAREHOUSE	67	STOR
16	U/I	68	U/I
17	LOADING PLATFORM	69	U/I
18	STEAMPLANT	70	PROB GREENHOUSE
19	2 BURIED POL TANKS	71	U/I
20	U/I	72	U/I
21	U/I	73	U/I
22	PROB PUMPHOUSE	74	ADMIN
23	LOADING PLATFORM	75A	POSS
24	U/I	B	HOSPITAL
25	U/I	C	
26	POSS STOR BLDG	76	U/I
27	U/I	77	U/I
28	POSS MAINT BLDG	78	U/I
29	U/I	79	U/I
30	FIRE STATION	80	U/I
31	U/I	81	CLUB-COMMISSARY
32	U/I	82	PROB GYMNASIUM
33	EARTH-BANKED STOR BLDG	83	U/I
34	MESSHALL	84	4 STORY APARTMENT
35	U/I	85-94	4 STORY APARTMENTS
36	U/I	95	BLDG U/C
37	U/I	96A	PRIMARY-SECONDARY SCHOOL
38	VEHICLE STORAGE	B	
39	VEHICLE STORAGE	C	
40	VEHICLE MAINT	97A	NURSERY SCHOOL
41	VEHICLE STORAGE	B	
42	VEHICLE STORAGE	C/D	
43	U/I	98A	MAIN ADMINISTRATION BLDG.
44	U/I	B/C	
45	U/I	99	2 D-GESTORS
46A	ADMIN FOR CONSTR	100	DEWATERING BLDG
B/C	VEHICLE MOTOR POOL		
47	PROB GREENHOUSE		

*OVERALL DIMENSIONS

FIGURE 11. BORISOGLEBSK RAIL FACILITY, MAIN HOUSING AND ADMINISTRATION AREA.



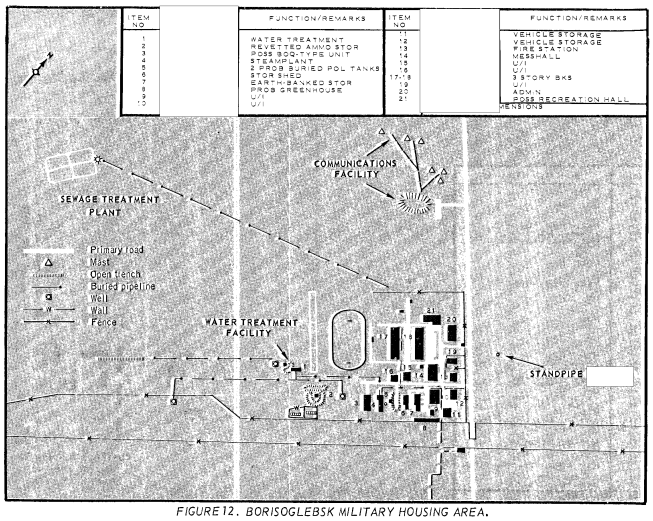


FIGURE 12. BORISOGLEBSK MILITARY HOUSING AREA.

istration Area and 2 three-story barracks in the Military Housing Area (Figures 11&12). An estimated 2,400 people could be accommodated in the former area and 1,180 military personnel could be housed in the latter area. Administration of the complex is apparently based in a U-shaped building located at the entrance to the Main Housing and Administration Area. One other building located in this same area probably houses additional administrative offices (Item 74, Figure 11). Additional support facilities in the Main Housing and Administration Area include a nursery school, a club-commissary, a primary-secondary school, a possible hospital, a water treatment facility, and two probable greenhouses (Figure 11). Extensive recreational facilities in the same area consist of a skating rink, tennis court, basketball court, two volleyball courts, a soccer field, track, and a probable gymnasium.

Other support facilities in the Military Housing Area include a mess hall, a water treatment facility, an administration building, sewage treatment plant, a probable greenhouse, a fire station, two garages, and a possible recreation hall (Figure 12).

Utilities. The water source for the Main Housing and Administration Area is comprised of at least nine wells, eight of which are connected to a water treatment facility by probable buried pipelines (Figure 11). The water treatment facility consists of a [redacted] building, two earth covered tanks/basins and a [redacted] standpipe for clear water storage. The simplicity of the facility suggests that the water is of relatively high purity requiring a minimum of clarification and chemical treatment. A pipeline-ditch leading away from the facility is probably for drainage of either overflow from the standpipe or residue from the treatment process. Three wells, a water treatment facility, and a [redacted] standpipe provide clear water for the Military Housing Area (Figure 12).

At least three of the four bunkers in the Operations Area have probable wells associated with them (Figure 10). Probable buried pipelines can be identified leading from nearby wells to Bunkers 3 and 4. Probable buried tanks are also located near each of the bunkers. They do not, however, appear to be connected to the probable water pipelines at Bunkers 3 and 4 and therefore are probably for storage of something other than water (perhaps POL).

Both the Main Housing and Administration Area and the Military Housing Area are provided with sewage treatment plants. The former plant consists of a coarse solids removal unit, two earth-mounded, [redacted] sludge digestors, a dewatering building, and a 60-by 35-foot segmented overflow basin. (See the section on comparative analysis for a discussion of the sewage treatment processes in use at the SOCs.) The sewage plant serving the Military Housing Area is comprised of a coarse solids removal unit, one [redacted] earth-mounded digestor, a small overflow basin and four sludge lagoons with a total surface area of 75,700 square feet.

A low-voltage powerline, which enters the site from the northeast, originates at a substation located on the outskirts of Gribanovskiy (Figure 10). Another low-voltage line can be seen leading from the vicinity of the Rail Facility toward the Military Housing Area. No powerlines were identified in the Operations Area.

Oil-fired steam plants are located in both the Rail Facility and the Military Housing Area. The Rail Facility plant serves the Main Housing and Administration Area as well as the Motor Pool and Rail Facility. A buried steamline can be traced from the plant into the Main Housing and Administration Area.

Communications. A communications facility is located at this complex near the Military Housing Area (Figure 12). The facility consists of a control bunker, a day/night pair of horizontal dipoles, a vee (quadrant) antenna, and a probable hardened (buried) antenna. The dipoles are 218 and 120 feet long and have an azimuth of 330/150 degrees. The vee antenna is 120 by 120 with azimuths of 325/145 [redacted] The probable hardened antenna is approximately 125 feet long and the width is undetermined. Approximate azimuth of this antenna is [redacted]

Transportation. Roads throughout the complex are primarily two-lane, all-weather roads of concrete construction. The complex Motor Pool, which is located near the Rail Facility, contains four vehicle storage buildings and one vehicle maintenance building which provide a total of approximately 72,130 square feet of floorspace.

The Rail Facility serving this complex is typical of those seen at the other complexes. The facility is located near the Main Housing and Administration Area and it consists of a four-track railcar holding yard, a traveling bridge crane, a locomotive shed, nine warehouses/storage buildings, loading platforms, and several additional unidentified buildings (Figure 11). A fire station is also located across the road from this facility (Item 30, Figure 11).

A T-shaped, concrete heliport located near the Military Housing Area is the only air-transport-related facility at the complex (Figure 10).3/ An apparently unused natural surface landing strip located west of the complex is probably not associated with the complex since the two are not connected by good quality roads. This strip was present on the previously mentioned [redacted] coverage. Fagot/Fresco aircraft have been observed at this complex, as they have at three other complexes. A special concrete hardstand has been constructed within the Rail Facility for these aircraft (Item 9, Figure 11) and on photography of [redacted] 1968 one Fagot/Fresco and four Fagot/Fresco fuselages were present there.

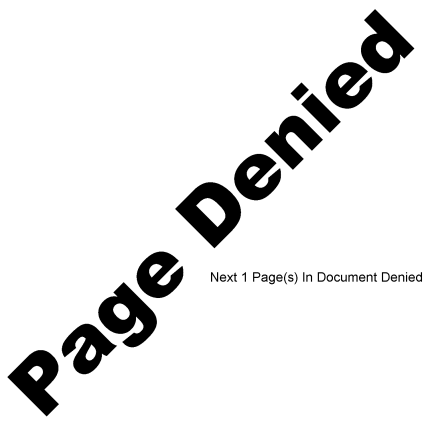
Security. Perimeter security for the Operations Area is provided by two fences and a patrol road/trail which completely encircle the area (Figure 10). Additional fences secure each of the four bunkers. A checkpoint limits access to this area at its only road entrance. Although a perimeter fence could not be identified around the support areas, checkpoints are present at appropriate points to limit road and rail access to the site. It should be pointed out, however, that heavy tree cover in this area might obscure such a fence. Individually secured sections within the support areas are shown in Figures 11 and 12.

Bulyzhino

The Bulyzhino Sensitive Operations Complex is located in a wooded area approximately 5 nm southwest of the city of Sebezh (Figure 1). 10/ This complex is comprised of the three major components seen at the other ten complexes. These are the Main Housing and Administration Area, the Military Housing Area, and the Operations Area (Figure 13). Additional support facilities at the complex include a rail facility, motor pool, sewage treatment plant, a heliport, and construction support facilities which have for the most part been razed (Figure 14). Significant geographic coordinates are as follows: Main Housing and Administration Area, 56-15-20N 028-19-45E; Operations Area, 56-13-10N 028-19-00E; Rail Facility, 56-14-30N 028-18-25E. The support areas of the complex were under construction when first observed on KEYHOLE photography of 30 August 1961, but construction in the Operations Area was not evident until [redacted] when photography showed at least two bunker excavations present. The complex appeared complete for the most part on photography of [redacted]

Housing and Administration. Housing in the Main Housing and Administration Area of the complex is composed of 10 four-story apartments, 10 two-family units, and 4 single-story BOQ-type units which provide accommodations for an estimated 2,020 people. Other facilities in this area which support the personnel housed here include a possible hospital, nursery school, a primary-secondary school, and a club-commissary (Figure 14). A fire station is also located in this area. Administration of the complex is apparently directed from the main administration building (Item 82) and possibly one other building (Item 78) located in this area (Figure 14).

Facilities in the Military Housing Area include 2 three-story barracks which house an estimated 1,090 military personnel, an administration building, a possible recreation hall, a messhall, fire station, and vehicle shed.



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Utilities. The water source for the support areas of the complex could not be identified. The only component of the water supply system observed was a standpipe situated in the Main Housing and Administration Area. Probable wells are located near Bunkers 3 and 4 in the Operations Area, and probable buried tanks can be identified near all six bunkers (Figure 13). The probable buried tanks are not necessarily for water storage, however, as indicated previously in the description of similar facilities near the Borisoglebsk bunkers.

The only sewage treatment plant at the complex is located between the Main Housing and Administration Area and the Rail Facility. This plant consists of a coarse solids removal unit, two 25-foot-diameter digestors, a small segmented overflow basin and 10 large sludge lagoons with a total surface area of 388,000 square feet.

A low-voltage powerline/communications line entering the complex at its north entrance is the only visible evidence of an outside power source. In addition, a small diesel power plant located in the Rail Facility probably provides a limited back-up source of power. No substation or high-voltage lines could be identified in the immediate vicinity of the complex. Utility poles could not be identified in the Operations Area.

An oil-fired steam plant located in the Rail Facility provides steam to all areas of the complex (Figure 14). The operations support buildings within the Operations Area are also provided with steam from this plant, but steamlines could not be traced to the bunkers.

Communications. A control bunker and a possible hardened (buried) antenna are the only identifiable communications facilities serving the complex. Identification of a possible hardened antenna is based primarily on the location and approximate size of a rectangular-shaped cleared area near the bunker. Dimensions and azimuths of the possible hardened antenna could not be determined from available photography. Above-ground antennas could not be identified in any area of the complex.

Transportation. The main roads throughout the complex are all-weather, mostly two-lane roads of concrete construction. The motor pool at the complex is located near the Rail Facility and it consists of six vehicle storage buildings and one vehicle maintenance building with a total floorspace of approximately 91,070 square feet.

A typical SOC-type Rail Facility is located between the Main Housing and Administration Area and the Military Housing Area (Figure 14). The facility consists of a 7-track railcar holding yard, a locomotive shed, a traveling bridge crane, and several warehouses.

This complex has a T-shaped heliport typical of most of the later complexes. 3/ No other air-transport-related facility could be identified at the complex. The nearest airfields of any significance are at Polotsk and Daugavpils approximately 46 nm southeast and 58 nm WSW of the complex respectively.

Security. Perimeter security for the Operations Area is provided by at least two fences which enclose the entire area. A patrol road/trail is visible between the fences only on two sides, but may be present but obscured by heavy tree cover in the other perimeter areas. The six large bunkers are also separately fenced for added security (Figure 13). The two additional closed fences within the Operations Area do not appear to secure any permanent structure and therefore may function as temporary storage or holding areas. A checkpoint limits access to the Operations Area at its only road entrance. Security fences and walls which could be identified in the support areas are shown in Figure 14.

Chebsara

The Chebsara Sensitive Operations Complex is situated along a road leading southwest from the city of Chebsara (Figure 1). 11, 12/ The complex consists of three widely separated components: the Rail Facility at 0.5 nm, the Main Housing and Administration Area at 3.5 nm, and the collocated Operations Area and Military Housing Area at approximately 8 nm from Chebsara. Geographic coordinates of the complex components are: Main Housing and Administration Area, 59-09-20N 038-43-40E; Operations Area, 59-06-00N 038-37-00E; and the Rail Facility, 59-11-10N 038-48-50E. Primary support facilities in addition to housing and administration include the previously mentioned Rail Facility, a motor pool, sewage treatment plant, a heliport, and construction support facilities. This complex was first observed on poor quality photography of at which time it appeared to be in an early stage of construction. The next photographic coverage dated showed the complex was in the mid stage of construction with at least two bunkers under construction in the Operations Area and numerous apartments and barracks already completed in the support areas. Construction continued at a slow pace from that point on until the last bunker to be constructed, Bunker 4, was observed in the process of being earth covered on coverage of thereby indicating that the complex was nearing completion. All construction appeared complete on Mission However, this same photography showed that the earth covering had been removed from Bunker 3, possibly to effect repairs on the roof. The earth covering had been replaced on this bunker by

Housing and Administration. The main housing facilities consist of 24 multistory apartments of various sizes, 5 two-family units, and 1 single-family unit which together provide housing for an estimated 2,230 people. Administration of the site appears to be centered in a 2-story U-shaped building (Item 34) and several other administration and/or institutional-type buildings located in the Main Housing and Administration Area (Figure 16).

Housing facilities in the Military Housing Area consist of 1 three-story barracks, 2 two-story barracks and 1 BOQ-type unit providing accommodations for an estimated 720 military personnel. Other facilities in this area include an administration building, a messhall, a possible recreation hall, fire station, and a vehicle storage building (Figure 17).

Utilities. Three wells located near the Operations Area apparently provide water for all areas of the complex except the Rail Facility (Figure 15). Probable buried pipelines can be traced from the wells to the Operations Area, the Military Housing Area, and the Main Housing and Administration Area. Water standpipes are located in the latter two areas. The Rail Facility has its own well which appears to be directly connected to a standpipe (Figure 18). No water treatment facilities were identified at the complex, which may be an indication that the water is used directly from the wells, possibly with some chlorination being accomplished in the well houses.

The sewage treatment plant serving the complex is located in the Main Housing and Administration Area and it consists of a coarse solids removal unit, a digestor, a dewatering building, and six sludge drying beds (Figure 16). The process utilized in this and other types of plants seen at the SOCs is discussed in the section on comparative analysis. The final effluent waste water from the plant is discharged into the Ugla River via a system of buried pipelines and ditches from the dewatering building.

The primary source of electric power for the complex is a 35-kv powerline which approaches the Main Housing and Administration Area from the west and terminates at a substation located in that same area. A diesel power plant, probably for stand-by purposes, is also located in this area adjacent to the substation. Similar plants have been identified at Bulyzhino, Golovchino, and Nyandoma.

Coal-fired steam plants located in the Main Housing and Administration Area, the Military Housing Area, and the Rail Facility provide steam to those areas. The Military Housing Area plant, however, also provides steam to the bunkers and operations support buildings in the Operations Area (Figure 15). Only those steamlines which are above ground could be traced because of the lack of suitable snow-cover photography required for locating the buried lines.

Communications. A communications control bunker (Item 14), a probable VHF antenna, and at least three probable horizontal dipoles are situated in the Military Housing Area (Figure 17). The presence of the dipoles is indicated by the ground scars (possibly feed lines) leading out from the bunker and by faintly visible cleared traces at the ends of these scars. Antenna masts were not visible, however, so antenna dimensions and azimuths could not be determined.

FIGURE 15. CHEBSARA SENSITIVE OPERATIONS COMPLEX, USSR,

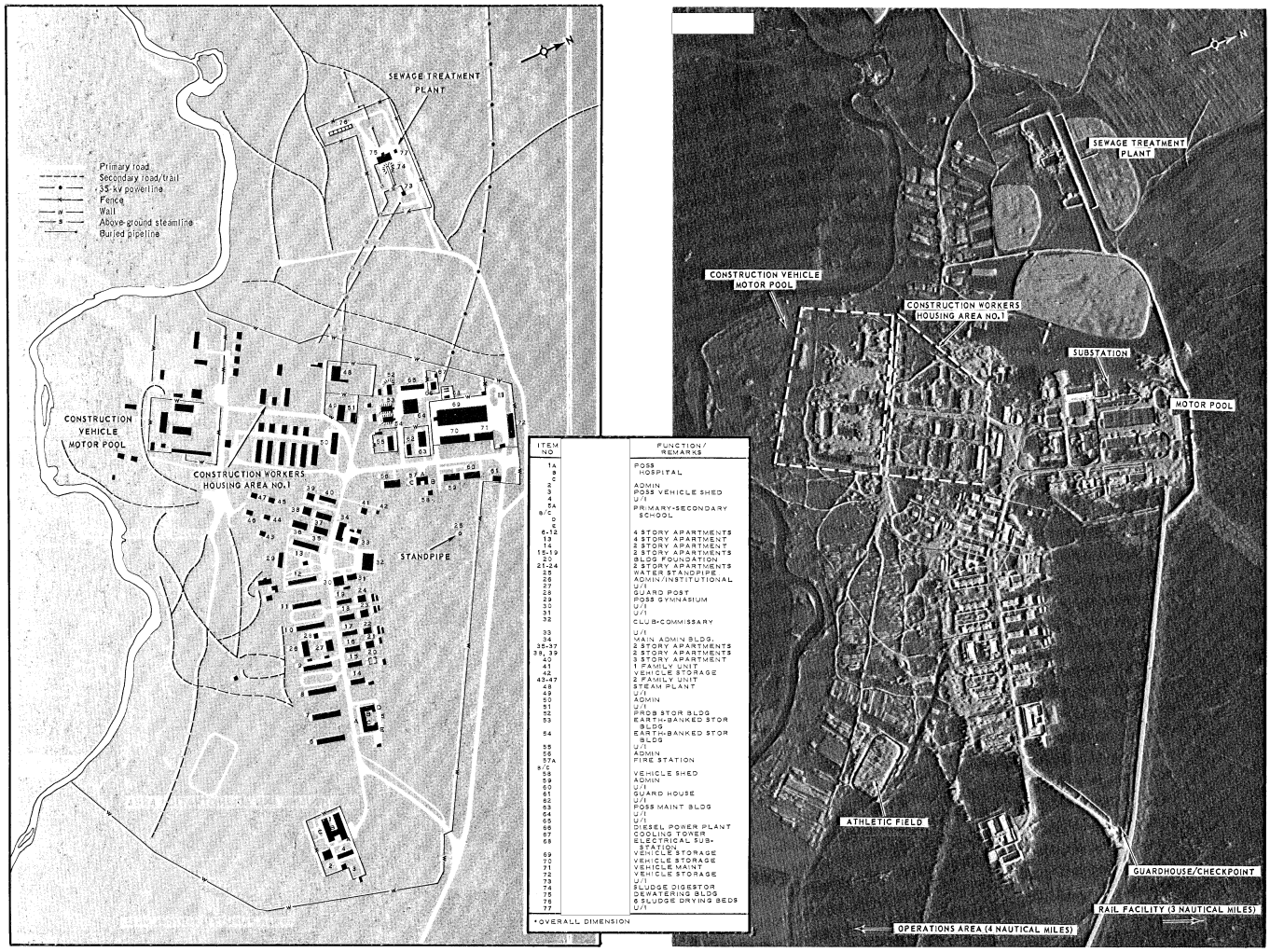
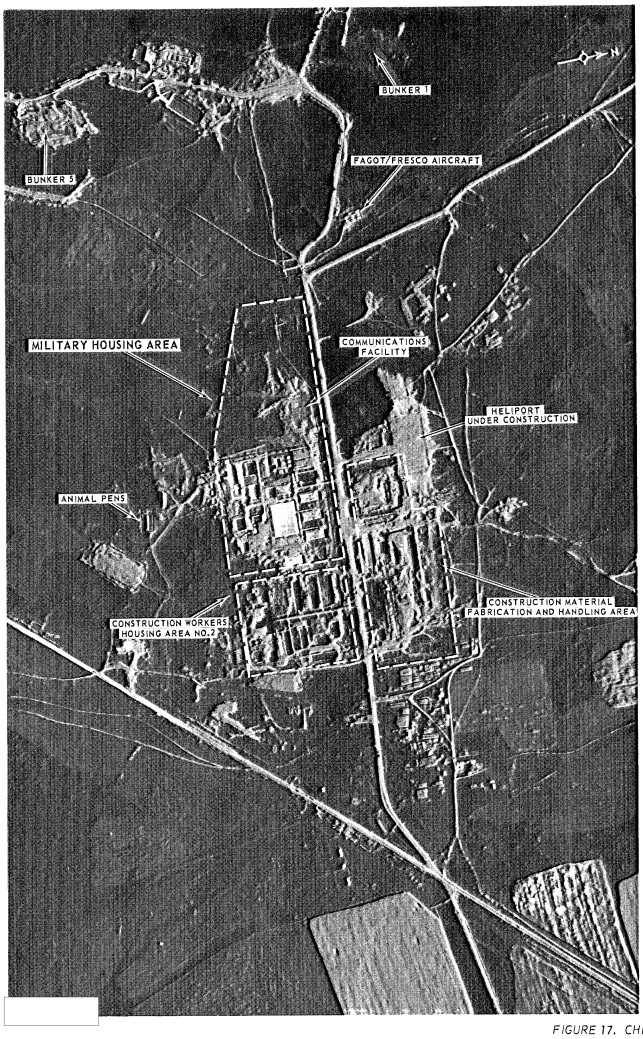


FIGURE 16. CHEBSARA MAIN HOUSING AND ADMINISTRATION AREA.



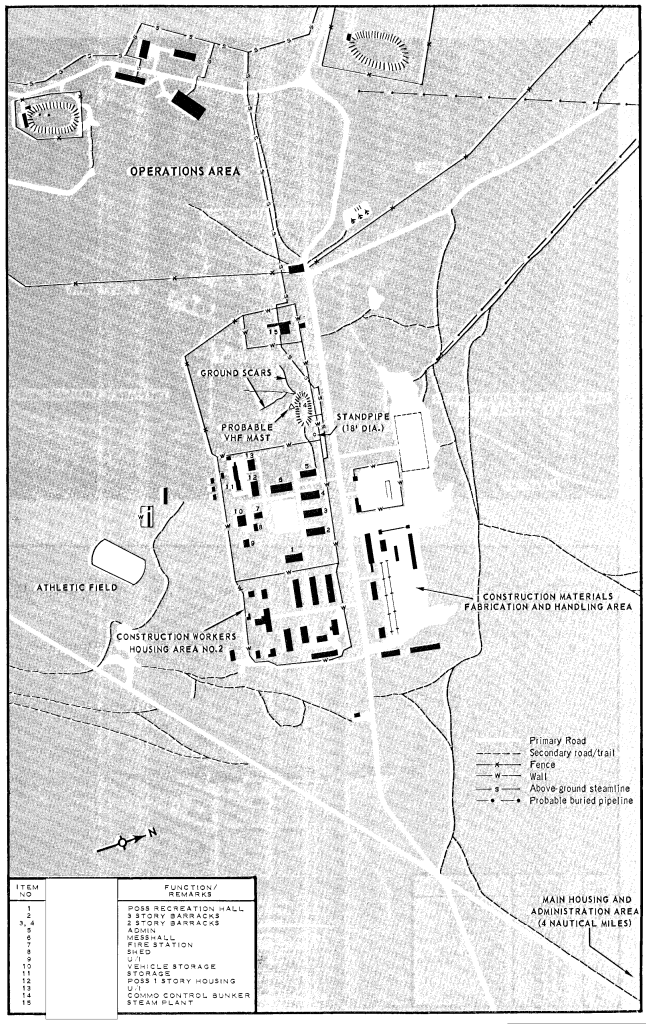
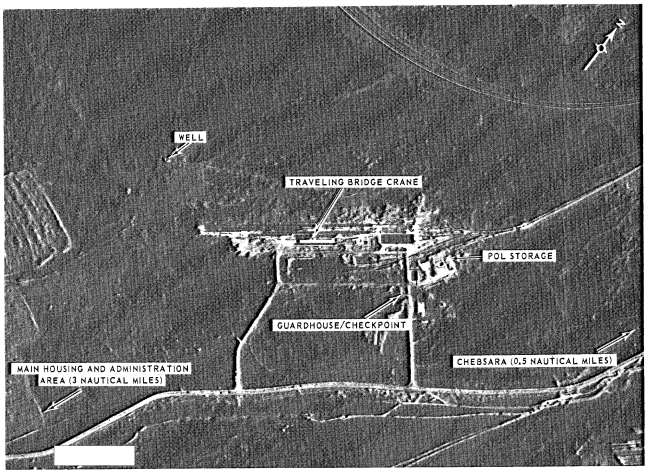


FIGURE 17. CHEBSARA MILITARY HOUSING AREA.



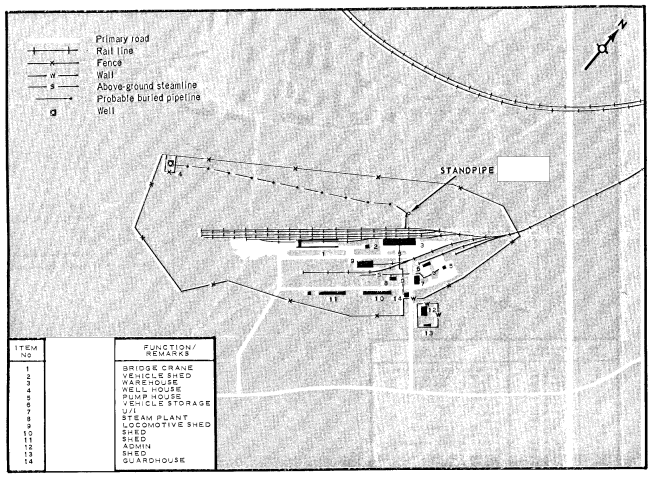


FIGURE 18. CHEBSARA RAIL FACILITY.

Transportation. The majority of the roads within the complex are all-weather roads probably of gravel or concrete construction. The motor pool for the site is located within the Main Housing and Administration Area. It consists of three vehicle storage buildings and one vehicle maintenance building with a total floorspace of approximately 81,310 square feet.

A secured rail facility serving the complex is located near the city of Chebsara at the end of a rail spur from the Vologda-Cherepovets double-track line. Within this facility are a 5-track railcar holding yard, a traveling bridge crane, a locomotive shed, warehouse, administration building, a garage, and several sheds (Figure 18).

A rectangular-shaped, concrete heliport in the Military Housing Area represents the only air-transport-related facility at the complex. The nearest airfield is located at Kipelovo, approximately 12 nm ENE of the Main Housing and Administration Area.

Security. A single fence provides perimeter security for the Operations Area (Figure 15). The five bunkers are also separately secured by fences. Two small buildings of unknown function near Bunker 2 are also secured by a fence. The Main Housing and Administration Area, the Military Housing Area, and the Rail Facility are secured by walls or fences with individually secured sections within these areas (Figure 16-18).

Golovchino

The Golovchino Sensitive Operations Complex is located along the Vorskla River approximately 1.5 nm west of the city of Golovchino and 4 nm northeast of Grayvoron (Figure 1). 11, 13/ The primary functional areas of this complex are the same as those of the other SOCs, i.e., a Main Housing and Administration Area, an Operations Area, and a Military Housing Area. The complex is physically located in three areas (Figure 19). The first area consists of the Rail Facility and Motor Pool at 50-31-45N 035-46-20E. The second area is the Main Housing and Administration Area at 50-32-30N 035-45-20E. The third area includes the Operations Area and Military Housing Area at 50-33-40N 035-44-20E. This complex, which was first observed in a mid-stage of construction on poor quality photography of [redacted] appeared essentially complete on KEYHOLE photography of [redacted] except for several apartments and barracks which were added later.

Housing and Administration. A wide variety of housing facilities are available at the Golovchino Complex. Thirty-five multistory apartments of at least six different types, 2 single-story apartments and 2 two-family units in the Main Housing and Administration Area and 32 two-family units in the Rail Facility provide housing for an estimated 3,090 people. Five barracks in the Military Housing Area will accommodate an estimated additional 1,190 military personnel.

Administration of the complex appears to be directed from four administration-type buildings located in the Main Housing and Administration Area. Additional support facilities in this area include a club-commissary, a nursery school, a possible recreation hall, a suspect hospital, a probable gymnasium and an athletic field (Figure 20). Support facilities in the Military Housing Area in addition to the housing include a messhall, a vehicle storage building, and several storage buildings.

Utilities. Two water standpipes, one near the Main Housing and Administration Area and one in the Rail Facility, are the only evidence of a water supply system at the complex. The water source or a treatment facility could not be identified.

A sewage treatment plant could not be identified at this complex. The apparent lack of such a plant may indicate that raw sewage is being discharged directly into the Vorskla River with little or no treatment.

A low-voltage powerline enters the site from the south near the Construction Workers Housing Area (Figure 20). This line originates at a substation located 3.5 nm southwest of the Rail Facility. The substation is served by a 110-kv powerline.

FIGURE 19. GOLOVCHINO SENSITIVE OPERATIONS COMPLEX, USSR.

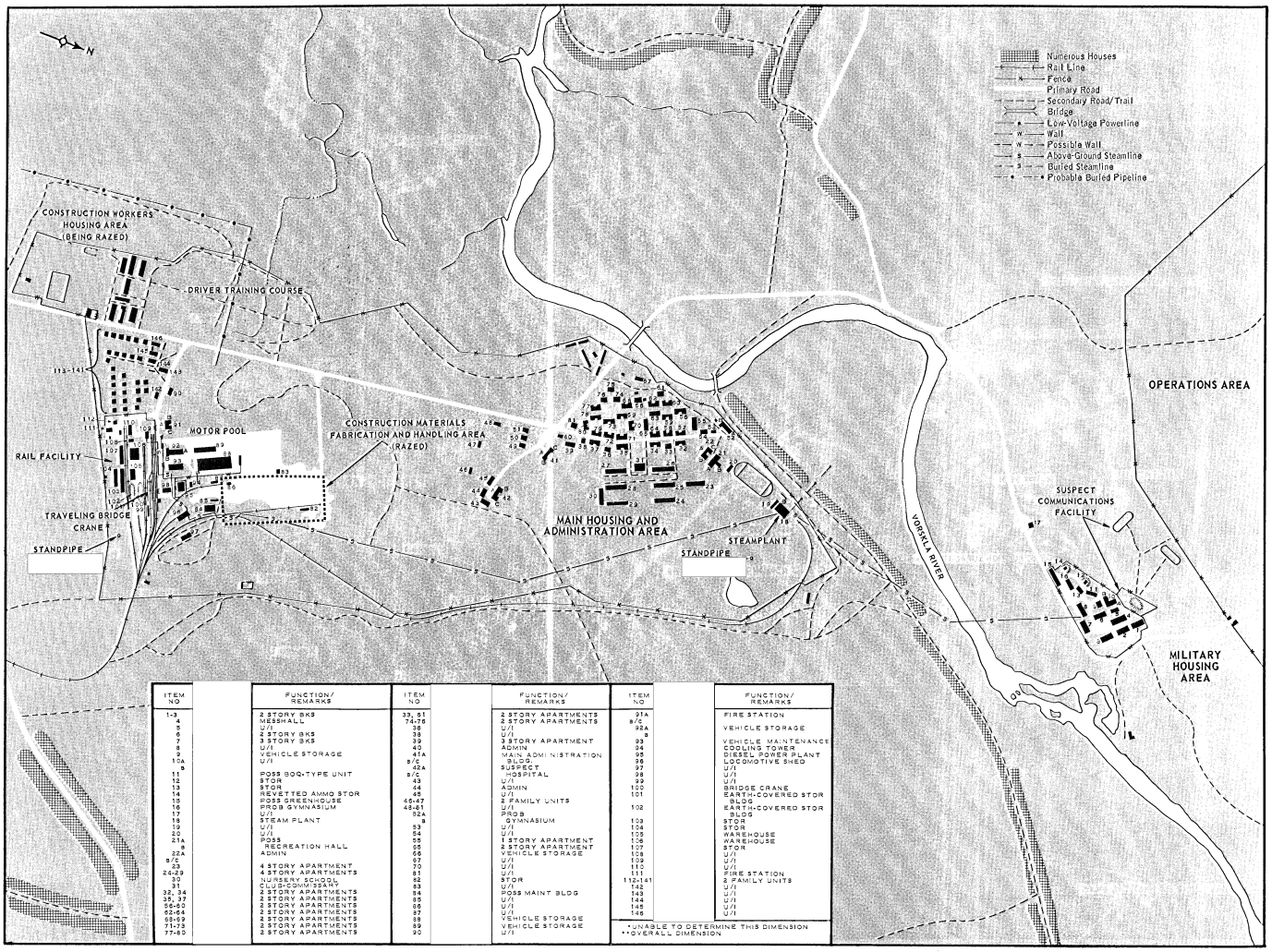


FIGURE 20. GOLOVCHINO SUPPORT AREAS.

One large, centrally-located, coal-fired steam plant serves the support areas of the complex. Steamlines, both buried and above ground, can be traced from the plant to the Rail Facility and Motor Pool area and to the Military Housing Area. No steamlines could be identified in the Operations Area.

Communications. A suspect communications facility is located in the Military Housing Area. The facility consists of an earth-covered probable control bunker and two rectangular clearings with straight traces through the trees connecting the clearings and the bunker (Figure 20). The quality and scale of available photography together with the vegetation in the clearings precludes the identification of antenna masts.

Transportation. The main road network within the complex consists primarily of all-weather roads constructed of concrete. The site Motor Pool, which is collocated with the Rail Facility at the main road and rail entrances to the complex, consists of three vehicle storage buildings and one vehicle maintenance building with a combined floorspace of approximately 84,500 square feet.

The Rail Facility, as mentioned previously, is located at the main entrance to the complex at the end of a spur from the Kharkov-Bryansk double-track, rail line. This facility has the typical traveling bridge crane used for road-to-rail transfer, a 3-track rail car holding yard, and the usual assortment of warehouses and storage buildings.

A rectangular concrete heliport similar to those at Chebsara and Berezovka is located within the Operations Area on a hill above the central valley. Several airfields, both concrete and natural surface, are located within 40 nm of the complex at such cities as Kharkov and Belgorod.

Security. The Operations Area is secured by at least a single fence and access to the area is controlled by a checkpoint at its only entrance (Figure 19). At least six of the eight bunkers and the operations support buildings located in this area are secured by fences. The Main Housing and Administration Area, the Rail Facility, and Motor Pool are secured together by a combination fence and wall (Figure 20). The Military Housing Area is apparently entirely secured by a wall.

Malin

The Malin Sensitive Operations Complex is located in dense woods approximately 13 nm southwest of Malin and 35 nm west-northwest of Kiev (Figure 1). This complex, only recently identified, is in an early stage of construction.14/ The complex when completed will consist primarily of a Main Housing and Administration Area, an Operations Area, and a Military Housing Area (Figure 21). The exact limits of the Operations Area are not apparent at this time. Other support facilities at the complex include a rail facility, a motor pool, a possible sewage treatment plant under construction and construction support facilities (Figure 22). Geographic coordinates of the center of the complex are 50-35N 029-28E.

Housing and Administration. Housing facilities at the complex as of [redacted] consisted of 14 multistory apartments in the Main Housing and Administration Area and one three story barracks in the Military Housing Area. Additional probable apartments and one probable barracks are under construction at the site, however. Estimated capacity of these housing facilities as of [redacted] is approximately 1,920 people in the apartments and approximately 520 military personnel in the one barracks building. The main administration building at this complex apparently has not yet been constructed. Additional support facilities in the Main Housing and Administration Area which have been completed to date are a club-commissary, a nursery school, and a primary-secondary school. A messhall is the only presently identifiable support building in the Military Housing Area in addition to the barracks.

Utilities. The water supply system serving the complex could not be identified.

A possible sewage treatment plant is under construction in a heavily wooded area northwest of the Main Housing and Administration Area.

A low-voltage powerline entering the complex from the southeast apparently provides the primary source of electric power to the installation.

Steam is provided for the complex by an oil-fired steam plant situated near the rail facility across from the Military Housing Area. Buried steamlines, or trenches intended for steamlines, can be traced from the plant to most areas of the complex (Figure 22). Three 45-foot-diameter POL storage tanks located nearby provide fuel to the plant.

Communications. Communications facilities could not be identified at the complex, but considering the present stage of construction, such facilities will probably be added later.

Transportation. The primary roads within the complex, although still under construction, are, or probably will be, all-weather, concrete-surfaced roads. Motor pool vehicle storage buildings completed as of [redacted] had a combined floorspace of approximately 63,590 square feet.

A rail facility presently consisting of a 4-track railcar holding yard under construction and two completed warehouses is located near the motor pool (Figure 22). A typical traveling bridge crane is under construction at the road-to-rail transfer point just inside the operations area.

No air-transport-related facilities were observed at the complex, and the nearest significant airfields are located at Kiev, 35 nm east-southeast of the complex.

Security. A perimeter fence is visible around part of the Operations Area (Figure 21). The remainder of the fence is either obscured by heavy tree cover or is still under construction. Checkpoints are located at both the Operations Area entrance and at the main road entrance to the complex (Figure 21). Fences which could be identified in the support areas are shown in Figures 21 and 22.

Mikhaylovka

The Mikhaylovka Sensitive Operations Complex is located approximately 3.5 nm west-northwest of the city of Mikhaylovka and 18 nm north of Kirovograd (Figure 1). The complex is composed of the three major areas typical of the SOCs (Figure 23). Geographic coordinates of the Main Housing and Administration Area are 48-50-35N 032-20-00E: coordinates of the Operations Area are 48-50-05N 032-16-50E. Other significant support facilities at the complex include a rail facility, motor pool, sewage treatment plants, a water treatment facility, communications facilities, a heliport, and construction support facilities. The complex was in a very early stage of construction on [redacted] and appeared to be essentially complete on [redacted] with the earth covering of the fourth, and probably last, bunker.

Housing and Administration. Permanent housing facilities at the complex consist of 15 four-story apartment buildings and 21 two-family units at the Main Housing and Administration Area and 2 three-story barracks in the Military Housing Area (Figure 24).

Facilities in the former area could accommodate an estimated 2,600 persons, while an estimated 1,100 military personnel could be housed in the latter area. Administration of the complex is probably centered in a two-story u-shaped building (Item 65, Figure 24) located in the Main Housing and Administration Area. Additional support facilities in the Main Housing and Administration Area include a nursery school, a primary-secondary school, a club-commissary, and a possible hospital. Recreational facilities in this area include a soccer field, a track, a basketball court, a large swimming pool, and a probable gymnasium.

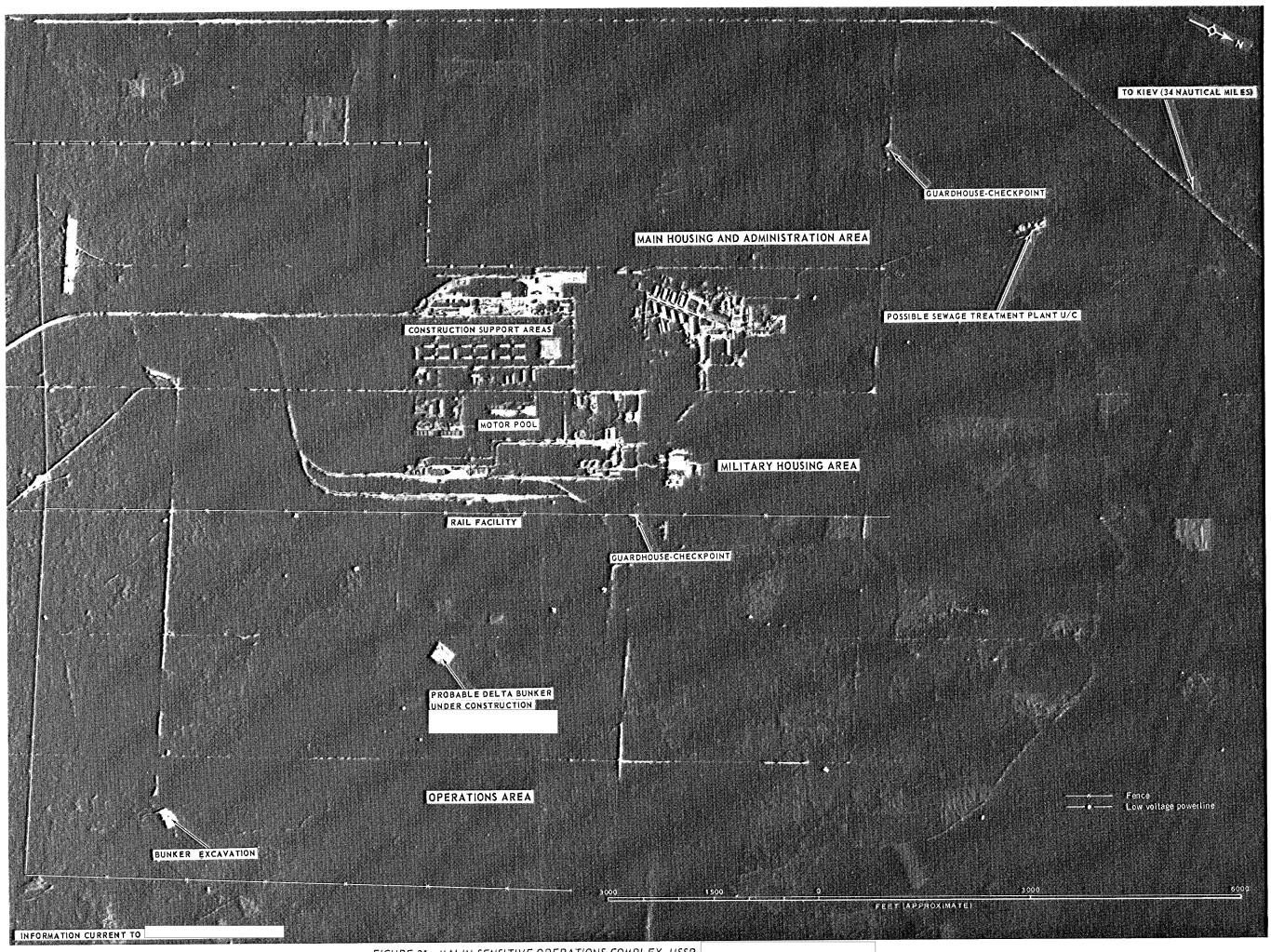
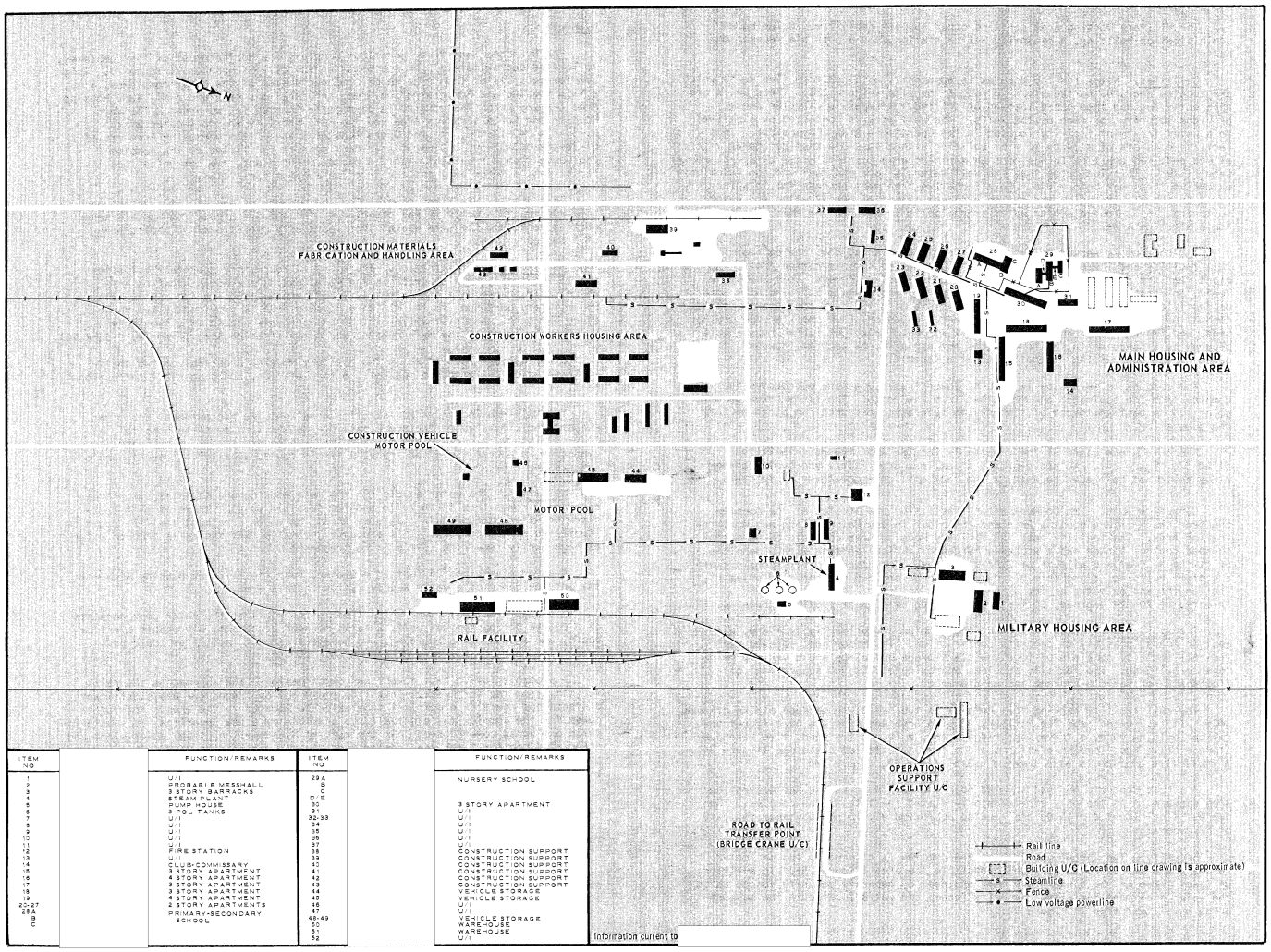


FIGURE 21. MALIN SENSITIVE OPERATIONS COMPLEX, USSR,



ITEM NO	FUNCTION/REMARKS
1	U/I
2	PROBABLE MESSHALL
3	3 STORY BARRACKS
4	STEAM PLANT
5	PUMP HOUSE
6	3 POL TANKS
7	U/I
8	U/I
9	U/I
10	U/I
11	U/I
12	FIRE STATION
13	U/I
14	CLUB-COMMISSARY
15	3 STORY APARTMENT
16	4 STORY APARTMENT
17	3 STORY APARTMENT
18	3 STORY APARTMENT
19	4 STORY APARTMENT
20-27	2 STORY APARTMENTS
28A	PRIMARY-SECONDARY SCHOOL
B	
C	

ITEM NO	FUNCTION/REMARKS
29A	
B	NURSERY SCHOOL
C	
D/E	
30	3 STORY APARTMENT
31	U/I
32-33	U/I
34	U/I
35	U/I
36	U/I
37	U/I
38	CONSTRUCTION SUPPORT
39	CONSTRUCTION SUPPORT
40	CONSTRUCTION SUPPORT
41	CONSTRUCTION SUPPORT
42	CONSTRUCTION SUPPORT
43	CONSTRUCTION SUPPORT
44	VEHICLE STORAGE
45	VEHICLE STORAGE
46	U/I
47	U/I
48-49	VEHICLE STORAGE
50	WAREHOUSE
51	WAREHOUSE
52	U/I

Information current to

FIGURE 22. MALIN SUPPORT AREAS.

The Military Housing Area contains other support facilities including an administration building, a messhall, a fire station, and a possible recreation hall.

Utilities. Water for the complex is apparently obtained from five wells which are located near the northeastern corner of the site (Figure 23). These wells are apparently dug and then cased instead of drilled. A separate circular fence provides security for each of the wells. The well area is connected by pipeline to a water treatment facility located in the Operations Area (Figure 23). This facility consists of a building with a possible chemical tower at one end, two small buildings, and an earth-covered possible clear water reservoir/sand filter. This indicates that the well water is hard and must undergo relatively extensive treatment before use. An alternative treatment process for this facility could be the clarification and cation exchange method of purification and water softening. A water standpipe is located in the Main Housing and Administration Area.

The complex is served by two sewage treatment plants, one located near the rail facility and the other near the Main Housing and Administration Area. The plant near the rail facility consists of a coarse solids removal unit an earth-banked digestor, and a small building with some unidentified function. The other plant consists of a coarse solids removal unit, an earth-banked digestor, four small sludge drying beds, and two buildings whose functions is unidentified. The latter facility is secured by a fence while the former does not appear to be secured (however, the dense forest surrounding it could conceal a fence).

The complex is served by two 110-kv powerlines. One line approaches the complex from the southeast and the other from the north. The lines converge at a point 1.4 nm east-southeast of the on-site substation and then run parallel into the substation.

The only steam plant at the complex is located near the rail facility (Item 32, Figure 24). No above-ground steamlines are visible and buried steamlines could not be traced because of the lack of light-snow-cover photography.

Communications. Two communications facilities are located at the complex one near the Military Housing Area and the other in the Main Housing and Administration Area. The facility near the Military Housing Area consists of an earth-mounded control bunker and a probable hardened (buried) antenna with dimensions of and azimuth of 205/25 degrees. The other facility consists of a control building, a probable microwave antenna, and two horizontal dipoles. The lengths and azimuths of the dipoles are as follows: 165 feet long and oriented at 50 feet long with an azimuth of

Transportation. Roads throughout the complex are primarily two-lane, all-weather roads, possibly of concrete construction. The motor pool located near the rail facility consists of four vehicle storage buildings and a vehicle maintenance building. The facility provides approximately 80,960 square feet of floorspace for vehicle storage and maintenance.

The rail facility serving this complex is typical of those seen at the other SOCs. It is located near the Military Housing Area and consists of a four-track railcar holding yard, a traveling bridge crane, a locomotive shed, five warehouse/storage buildings, loading platforms and a few unidentified buildings (Figure 24). A small fire station is also located nearby (Item 14, Figure 24).

A single concrete helipad located near the Main Housing and Administration Area appears to be the only air-transport-related facility at the complex. The nearest significant airfields are located approximately 18 nm away near the city of Kirovograd.

Security. The Operations Area of the complex is secured by two perimeter fences and a patrol road/trail which encircle the area (Figure 23). In addition, at least three of the bunkers are each enclosed by separate security fences as is the water treatment facility. Security fences and walls located in the support areas are illustrated in Figure 24.

Nyandoma

The Nyandoma Sensitive Operations Complex, the northernmost of the complexes, is located approximately 2 nm southeast of the city of Nyandoma (Figure 1). This complex consists of the three major components seen at the other complexes, i.e., a Main Housing and Administration Area, an Operations Area and a Military Housing Area (Figure 25). The complex is physically located in two areas. The Main Housing and Administration Area and the Rail Facility are collocated at 61-37-50N 040-17-40E, and the Operations Area and Military Housing Area are at 61-38-45N 040-22-50E. Other significant support facilities at the complex include a sewage treatment plant, a diesel power plant, two communications facilities, a motor pool and construction support facilities.

This complex was first observed on photography of August 1960. Although some construction activity was observed in the support areas, the bunkers were earth covered and the site was at least partially operational on photography

Housing and Administration. There are 10 four-story apartment buildings and 13 two-family housing units in the Main Housing and Administration Area which could accommodate approximately 1,800 people. Housing for approximately 990 military personnel in the Military Housing Area is provided by two three-story barracks. Administrative offices are probably housed in a two-story U-shaped building in the Main Housing and Administration Area (Item 74, Figure 26).

Other support facilities in the Military Housing Area include two small administration buildings, a messhall, a fire station, and a possible recreation hall.

The Main Housing and Administration Area contains recreational and other support facilities which include a possible messhall, a possible hospital, a club-commissary, a nursery school, a primary-secondary school, a probable gymnasium, a soccer field and track, a tennis court, a basketball court, and an ice skating rink.

Utilities. The water supply for the Main Housing and Administration Area apparently comes from three wells and two possible wells. There is a diameter water standpipe in this same area. No water treatment facility could be identified at the complex. This probably indicates that the wells produce water of high purity requiring little or no treatment.

A water standpipe, near the Military Housing Area is the only evidence of a water supply system in this area.

A sewage treatment plant which lies to the south of the motor pool consists of a coarse solids removal unit, 2 earth-mounded digestors, a probable overflow basin, and a dewatering building. No sewage treatment facilities could be identified near the Military Housing Area.

A probable low-voltage powerline/communications line approaches the rail facility from the northwest. This line could not be traced for any significant distance nor could an electrical substation be located in the area. Additional power for the complex may eventually be provided by a new powerline and substation which are under construction near the city of Nyandoma. A diesel power plant and associated cooling tower are located near the railcar holding yard. This plant probably serves as a back-up power source for the complex. Similar power plants are present at Bulyzhino, Chebsara, and Golovchino.

A steam plant serving the Main Housing and Administration Area, the Rail Facility, and the Motor Pool is located near the railcar holding yard. Two POL tanks are buried alongside the building. Buried steamlines can be traced from the steam plant to various buildings in the above-mentioned areas (Figure 26).

A smaller steam plant is located in the Military Housing Area. It serves the Military Housing Area, the nearby communications bunker, the operations support buildings, and the three bunkers in the Operations Area (Figures 25 and 27). The paths of the various underground steamlines are shown in Figures 25 and 26.

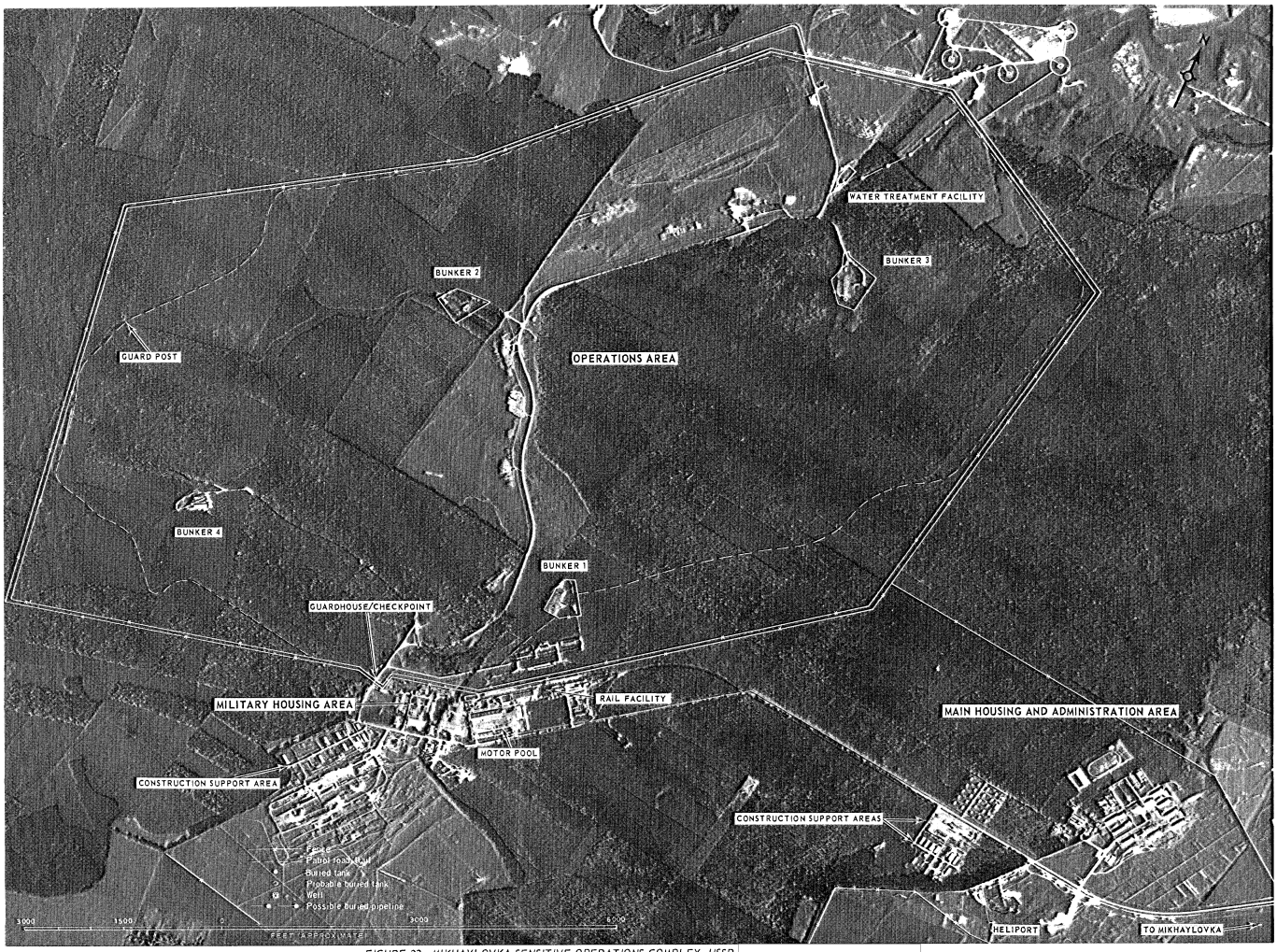


FIGURE 23. MIKHAYLOVKA SENSITIVE OPERATIONS COMPLEX, USSR,

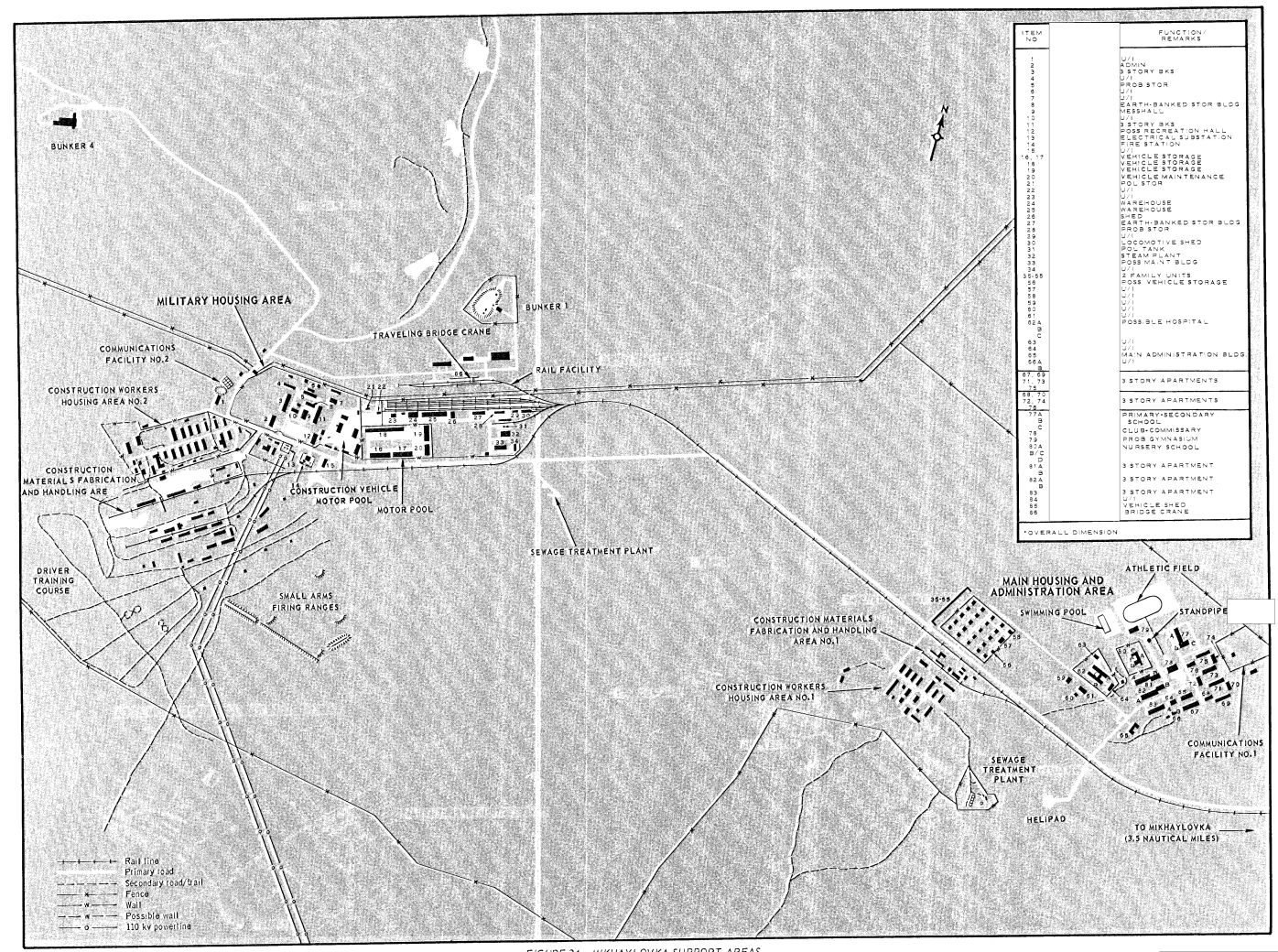


FIGURE 24. MIKHAYLOVKA SUPPORT AREAS.

Communications. Communications Facility No. 1 consists of a control bunker with an associated hardened (buried) antenna and is located near the Military Housing Area. The dimensions of the antenna are

Communications Facility No. 2, located near the rail facility, consists of a control building, a day/night pair of horizontal dipoles, and a single horizontal dipole. The day/night pair of horizontal dipoles have dimensions of The single horizontal dipole is

Transportation. The primary roads throughout the complex appear to be 2-lane, hard-surfaced roads possibly of concrete construction. The Motor Pool contains four vehicle storage buildings and one vehicle maintenance building which together provide a total of approximately 60,550 square feet of floorspace for vehicle storage and maintenance.

The rail facility at this complex is typical of those seen at the other SOCs. It consists of a 6-track railcar holding yard, a locomotive shed, a traveling bridge crane, and numerous storage buildings/warehouses. The traveling bridge crane has dimensions of

The nearest airfield to the complex is a natural surface landing strip located 2.5 nm southwest of the city of Nyandoma. There are no significant airfields within 50 nm of the complex. A small separately secured area adjacent to the rail facility contains three Fagot/Fresco aircraft and three Fagot/Fresco fuselages. The only air-transport-related facility at the complex is a T-shaped concrete heliport located near the Military Housing Area (Figure 27).

Security. The Operations Area of the complex is surrounded by at least one security fence. In addition, the three bunkers in the Operations Area are enclosed by separate security fences (Figure 25). Other security fences and walls in the Main Housing and Administration Area and at the Rail Facility are shown in Figure 26.

Rechitsa

The Rechitsa Sensitive Operations Complex is located approximately 11 nm WNW of Rechitsa and 31.5 nm west of Gomel (Figure 1). The main components of the complex are a Main Housing and Administration Area, an Operations Area, and a Military Housing Area (Figure 28). Significant geographic coordinates of the complex are: The Main Housing and Administration Area and the Rail Facility at 52-26-05N 030-05-05E; the Operations Area and the Military Housing Area at 52-28-05N 030-03-50E. Major support facilities at this complex include a rail facility, motor pool, sewage treatment plant, water treatment facility, a heliport and partially razed, construction support facilities. This complex, which was observed in a very early construction phase on photography of was complete on coverage of

Housing and Administration. Permanent housing facilities at Rechitsa consist of 10 four-story apartments, 7 two-family units and 2 single-family units in the Main Housing and Administration Area and 2 three-story barracks in the Military Housing Area. Estimated capacity of these facilities is 1,960 people in the former area and 1,230 military personnel in the latter.

The main administration building and one other building located in the Main Housing and Administration Area probably house most of the administrative offices at the complex. An additional administration building is located in the Military Housing Area.

Other housing support facilities in the Main Housing and Administration Area include a club-commissary, a nursery school, a primary-secondary school, a possible hospital, and a fire station. A messhall, a possible recreation hall, and a storage building support the housing in the Military Housing Area.

Utilities. The water supply system at the Rechitsa Complex consists of at least one well, a small water treatment facility, and a standpipe, all located near the Main Housing and Administration Area. The water treatment facility consists of three small buildings and a buried reservoir/filter. The type of treatment utilized at this facility, although obviously relatively simple, cannot be identified.

The sewage treatment plant serving the complex is located just east of the rail facility. This plant is comprised of two earth-mounded digestors, a small overflow basin, and eight sludge lagoons with a total surface area of 437,000 square feet. Probable buried pipelines lead from the general vicinity of the Main Housing and Administration Area and the motor pool to the plant.

A substation located 0.8 nm west of the Main Housing and Administration Area provides low-voltage power to the complex. The substation is served by a 110-kv powerline.

An oil-fired steam plant is located in the rail facility. This one plant apparently serves the entire complex, since steamlines can be traced from the plant to the Military Housing Area and toward the Main Housing and Administration Area.

Communications. Two communications facilities are located at this complex (Figure 29). Facility No. 1 is in the Main Housing and Administration Area and consists of two horizontal dipoles and a control building. The dipole antennas are 100 feet long and are oriented to respectively. Facility No. 2 is located near the Military Housing Area and is comprised of a control bunker, a day/night pair of horizontal dipoles, a vee (quadrant) antenna, and a hardened (buried) antenna. The day/night pair of dipoles are 220 and 125 feet long and are oriented to 224/44 degrees. The vee antenna is with orientations of and 335/155 degrees. The hardened antenna is 105 feet and has an orientation of

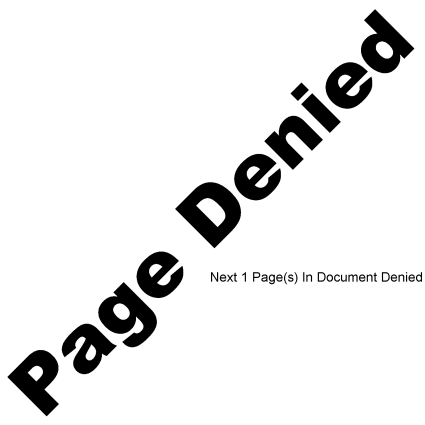
Transportation. The primary roads within the complex are two-lane, all-weather roads mostly of concrete construction. Approximately 50,050 square feet of vehicle storage and maintenance space is available in the three vehicle storage buildings and one vehicle maintenance building located in the site motor pool.

A typical SOC-type rail facility is located at the Rechitsa Complex (Figure 29). The facility consists of a traveling bridge crane, a 7-track railcar holding yard, a locomotive shed, and several warehouses and storage buildings.

A T-shaped heliport, typical of those seen at many of the later complexes, is situated along the central service road across from Communications Facility No. 2. No other air-transport-related facility is located at the complex, and the nearest significant airfields are near Kalinkovichi and Gomel, 29 and 38 nm from the complex respectively.

Security. Perimeter security for the Operations Area is provided by double fencing and a patrol road/trail which enclose the entire area (Figure 28). Additional fences individually secure each of the six bunkers. Vehicular access to the area is limited by a checkpoint at the only road entrance to the area.

Security fences and walls identified in the support areas of the complex are shown on Figure 29.



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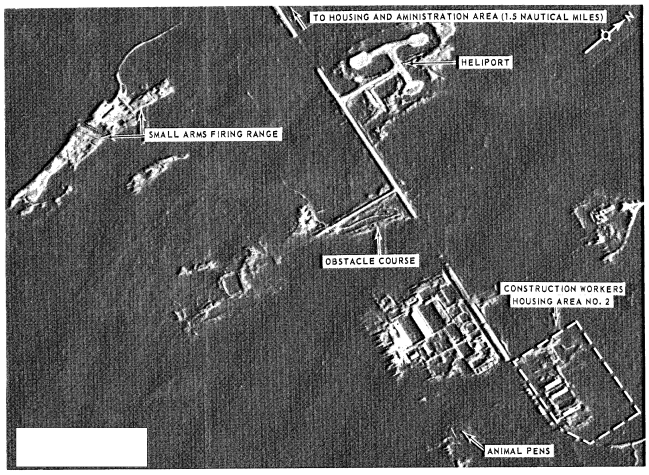


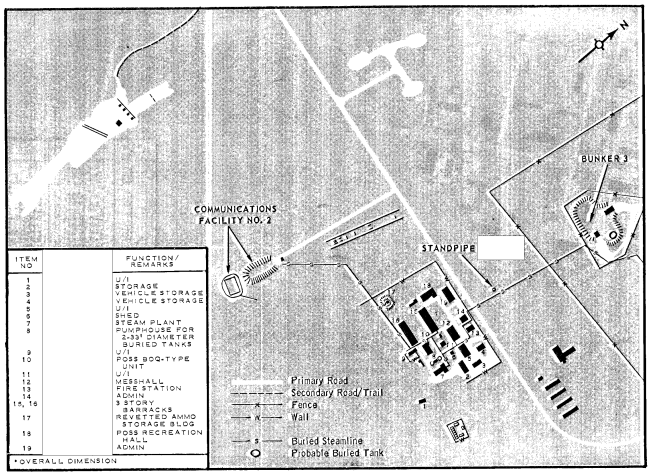
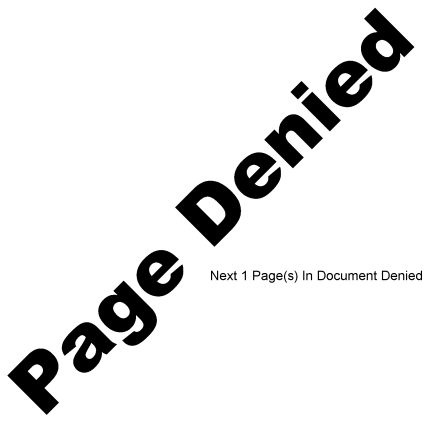


FIGURE 27. NYANDOMA MILITARY HOUSING AREA.



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Zhukovka

The Zhukovka Sensitive Operations Complex is located approximately 6 nm southeast of Zhukovka and 22 nm northwest of Bryansk (Figure 1). 15/ This complex consists of the usual three major areas found at the SOCs, a Main Housing and Administration Area, an Operations Area and a Military Housing Area (Figure 30). However, the complex is physically located in two areas approximately 5 nm apart. Coordinates of these two areas are: The Main Housing and Administration Area and Rail Facility at 53-29-40N 033-52-45E; the Operations Area and Military Housing Area at 53-33-40N 033-58-15E. Additional support facilities at the complex include a Rail Facility, Motor Pool, a heliport, two sewage treatment plants and typical construction support facilities. This site was first observed on KEYHOLE photography in April 1962 at which time it was in an early stage of construction. All six bunkers were complete and earth-covered on photography of [redacted] although some construction was still in progress in the support areas.

Housing and Administration. Permanent housing facilities at the Zhukovka Complex consist of 11 four-story apartments, 16 two-family units and 4 probable BOQ-type units in the Main Housing and Administration Area and 2 three-story barracks in the Military Housing Area. The estimated capacity of these facilities is 2,440 people in the first area and 1,230 troops in the second. Other significant housing support facilities in the Main Housing and Administration Area include a club-commissary, a probable gymnasium, a nursery school, a primary-secondary school, a possible hospital and a fire station. The administrative offices of the complex are apparently located in a U-shaped building (Item 40, Figure 31) and probably in one other building (Item 38, Figure 31) located in the Main Housing and Administration Area. Additional support facilities in the Military Housing Area consist of a messhall, two vehicle sheds, a fire station, a possible recreation hall and an administration building (Figure 32). Recreational facilities in the Main Housing and Administration Area, in addition to those previously mentioned, include an ice skating rink, a track, a soccer field, two volleyball courts, and a basketball court. The Military Housing Area also has a probable gymnasium, a track, a soccer field and a basketball court.

Utilities. Standpipes located in the Main Housing and Administration Area and the Military Housing Area are the only components of a water supply system that could be identified at this complex. The water source or treatment facility is not evident in any area of the complex.

Sewage treatment plants are provided for both the Main Housing and Administration Area and Military Housing Area (Figures 31 and 32). The former plant consists of a possible coarse solids removal unit, two earth-mounded digestors, an overflow basin and eight sludge lagoons with a total surface area of 344,000 square feet. The plant serving the Military Housing Area is similar to, but slightly smaller than, the previously described plant. It consists of two earth-mounded digestors, an overflow basin and six sludge lagoons with a combined surface area of 264,850 square feet. The sewage treatment process utilized in this type of plant as well as plants at the other SOCs is described in the section on comparative analysis.

A 35-kv powerline apparently supplies the primary electric power for the complex. This line approaches the site from the west and terminates at a substation located in the Main Housing and Administration Area.

Two oil-fired steam plants serve the complex, one each in the Rail Facility and Military Housing Area. Buried steamlines could be traced from the Rail Facility plant to the Motor Pool, to the Main Housing and Administration Area and to buildings within the Rail Facility (Figure 31). The Military Housing Area plant provides steam to the operations support buildings within the Operations Area in addition to the buildings within the Military Housing Area (Figure 32). The bunkers in the Operations Area do not appear to be served by steamlines from this plant.

A recent addition to the utilities at the site is a probable natural gas pipeline which approaches the complex from the direction of Zhukovka (Figure 31). Photography of [redacted] revealed an open trench leading into the complex from the southwest. The trench was traced back to Zhukovka where it indirectly tied into a buried probable natural gas pipeline running NW-SE and passing approximately 6 nm to the south of Zhukovka city. 5/ 25X1

Communications. This complex has two communications facilities, Facility No. 1 at the Main Housing and Administration Area and Facility No. 2 at the Military Housing Area. The antennas at Facility No. 1 are a day/night pair of horizontal dipoles with dimensions of [redacted] 25X1
degrees. Also located in this facility are a control building, a buried tank 25X1
and three other small buildings/structures. Facility No. 2 consists of a control bunker, a horizontal dipole and a vee (quadrant) antenna. The horizontal dipole is 220 feet long and its azimuth is [redacted] The vee antenna is 25X1
[redacted] and has orientations of 195/15 and [redacted] degrees. 25X1X1

Transportation. Roads within the complex are primarily two-lane, all-weather roads of either concrete or gravel. A driver training course consisting of a typical figure eight course and at least six other types of obstacles is located just north of the Main Housing and Administration Area. The four vehicle storage buildings and one vehicle maintenance building in the Motor Pool provide a total floorspace of approximately 82,600 square feet.

A typical SOC-type rail facility serves this complex. It is located southeast of the Main Housing and Administration Area and consists of a 5-track railcar holding yard, a locomotive shed, and several warehouses and storage buildings. The traveling bridge crane at this complex is not situated at the Rail Facility, but it is located within the Operations Area at the end of a spur which terminates near the operations support buildings (Figure 32). This is also true at Belev, Malin, and Mikhaylovka.

A T-shaped heliport, which was under construction in April 1966 and is now completed, is located near the Military Housing Area (Figure 32). No other air-transport-related facility is located at the complex. Significant airfields are, however, located at Bryansk and Sechcha, 21 and 23 nm respectively from the complex.

Security. Perimeter security for the Operations Area is provided by at least two fences and probably by foot or vehicle patrols along a road/trail which encircles the area and is located just inside the inner security fence (Figure 30). In addition, the six bunkers, the operations support facility and two small buildings are separately secured by fences. Fences and walls identified in the support areas of the complex are shown in Figures 31 and 32. Vehicular traffic is controlled at the entrance to the complex and at the Operations Area entrance by checkpoints. The revetted ammunition storage building and animal pens in the Military Housing Area probable provide direct support to the security operations at the site. The animal pens probably house patrol/sentry dogs.

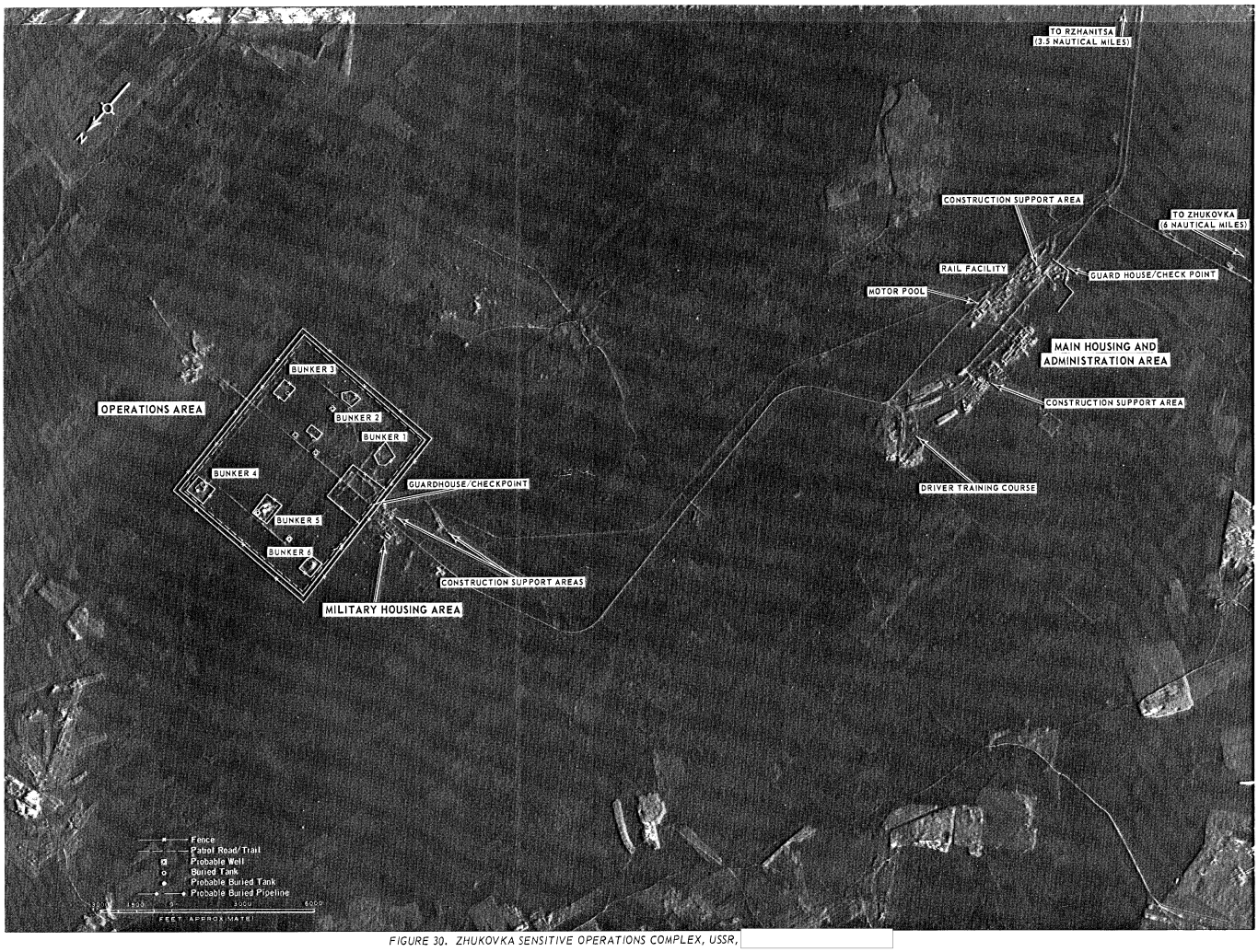
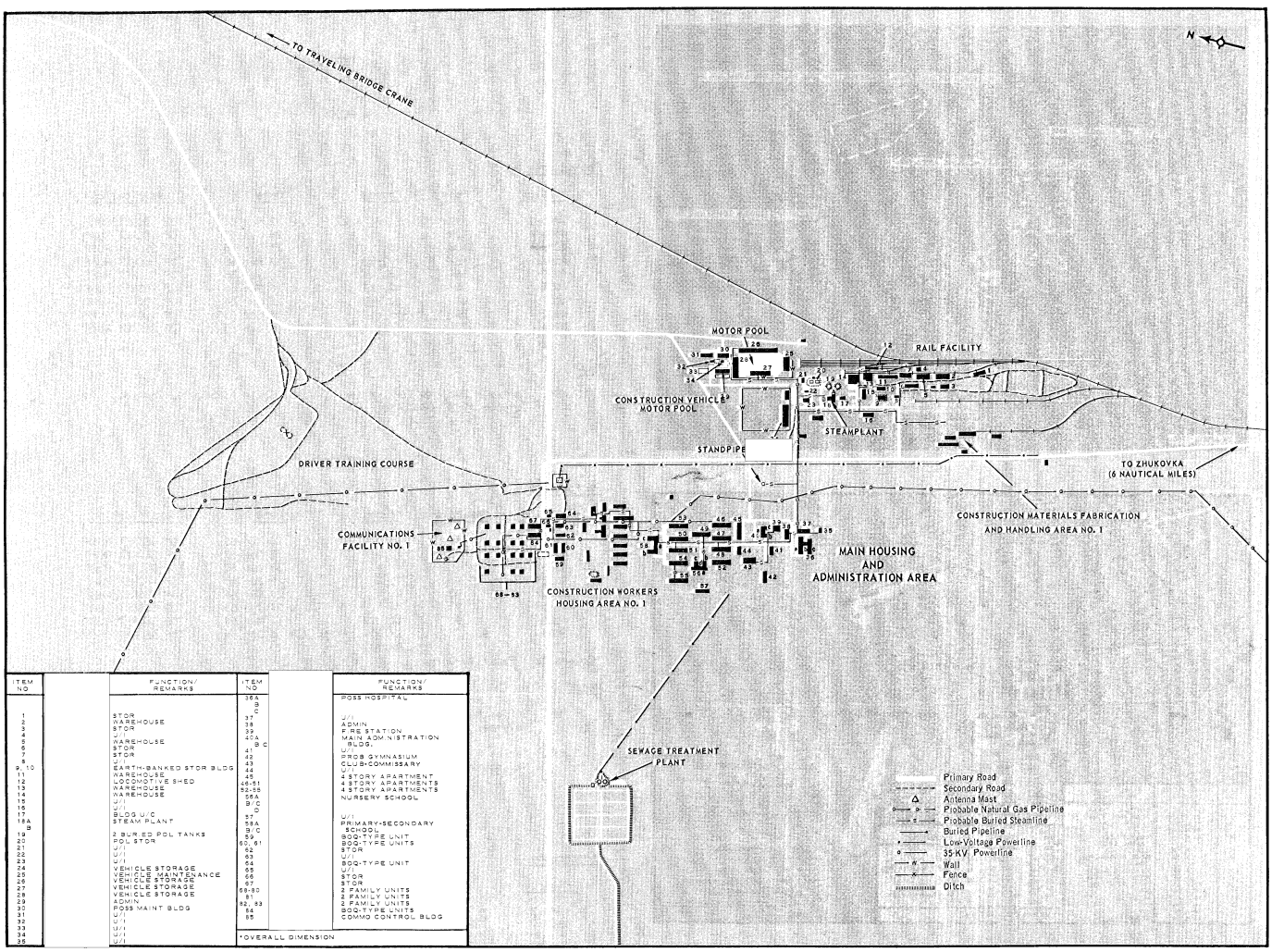


FIGURE 30. ZHUKOVKA SENSITIVE OPERATIONS COMPLEX, USSR,

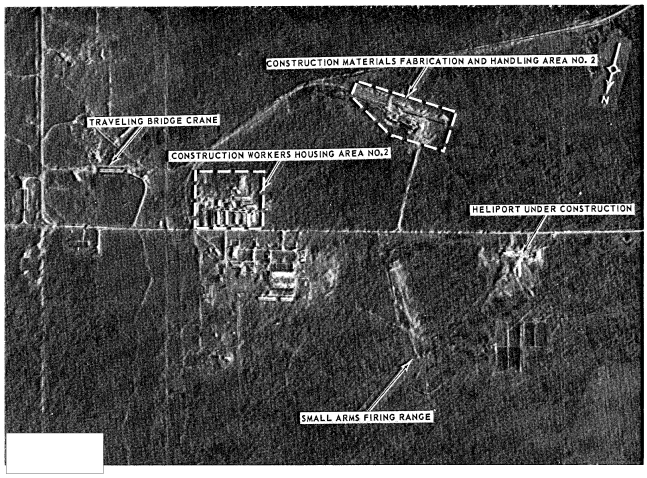


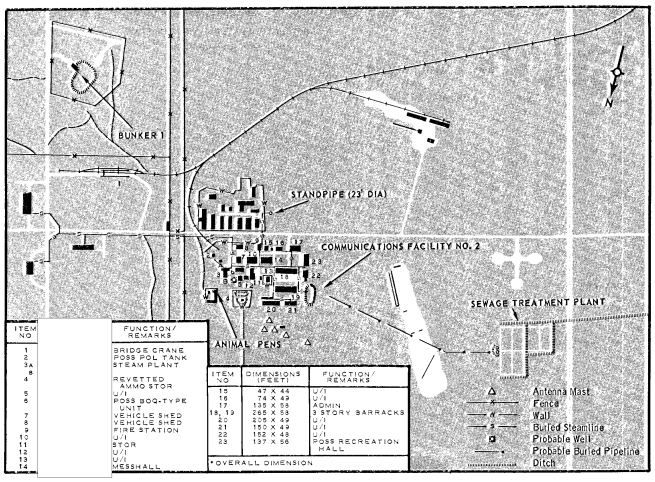
ITEM NO	FUNCTION/ REMARKS
1	STOR
2	WAREHOUSE
3	STOR
4	U/I
5	WAREHOUSE
6	STOR
7	STOR
8	U/I
9, 10	EARTH-BANKED STOR BLDG
11	WAREHOUSE
12	LOCOMOTIVE SHED
13	WAREHOUSE
14	WAREHOUSE
15	U/I
16	U/I
17	BLDG U/C
18A	STEAM PLANT
B	
19	2 BURIED POL TANKS
20	POL STOR
21	U/I
22	U/I
23	U/I
24	VEHICLE STORAGE
25	VEHICLE MAINTENANCE
26	VEHICLE STORAGE
27	VEHICLE STORAGE
28	VEHICLE STORAGE
29	ADMIN
30	POSS MAINT BLDG
31	U/I
32	U/I
33	U/I
34	U/I
35	U/I

ITEM NO	FUNCTION/ REMARKS
36A	POSS HOSPITAL
B	
C	
37	U/I
38	ADMIN
39	FIRE STATION
40A	MAIN ADMINISTRATION BLDG.
B,C	
41	U/I
42	PROB GYMNASIUM
43	CLUB-COMMISSARY
44	U/I
45	4 STORY APARTMENT
46-51	4 STORY APARTMENTS
52-55	4 STORY APARTMENTS
56A	NURSERY SCHOOL
B,C	
D	
57	U/I
58A	PRIMARY-SECONDARY SCHOOL
B,C	
59	BOQ-TYPE UNIT
60, 61	BOQ-TYPE UNITS
62	STOR
63	U/I
64	BOQ-TYPE UNIT
65	U/I
66	STOR
67	STOR
68-80	2 FAMILY UNITS
81	2 FAMILY UNITS
82, 83	2 FAMILY UNITS
84	BOQ-TYPE UNITS
85	COMMO CONTROL BLDG

*OVERALL DIMENSION

FIGURE 31. ZHUKOVKA RAIL FACILITY, MAIN HOUSING AND ADMINISTRATION AREA.



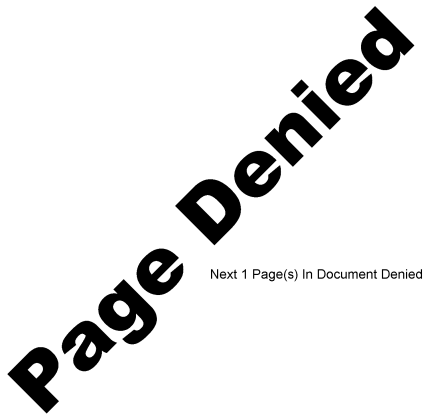


ITEM NO	FUNCTION/ REMARKS
1	BRIDGE CRANE
2	POSS POL TANK
3A	STEAM PLANT
3B	
4	REVETTED AMMO STOR
5	U/I
6	POSS BOQ-TYPE UNIT
7	VEHICLE SHED
8	VEHICLE SHED
9	FIRE STATION
10	U/I
11	STOR
12	U/I
13	U/I
14	MESSHALL

ITEM NO	DIMENSIONS (FEET)	FUNCTION/ REMARKS
15	47 X 44	U/I
16	74 X 49	U/I
17	135 X 58	ADMIN
18, 19	265 X 58	3 STORY BARRACKS
20	205 X 49	U/I
21	150 X 49	U/I
22	152 X 48	U/I
23	137 X 86	POSS RECREATION HALL

*OVERALL DIMENSION

FIGURE 32. ZHUKOVKA MILITARY HOUSING AREA.



Next 1 Page(s) In Document Denied

ALL COMPLEXES

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15.
16.

Requirement

C-SI-784,642

Project

050056